Vol. 1109 Number 2

OFFICIAL GAZETTE

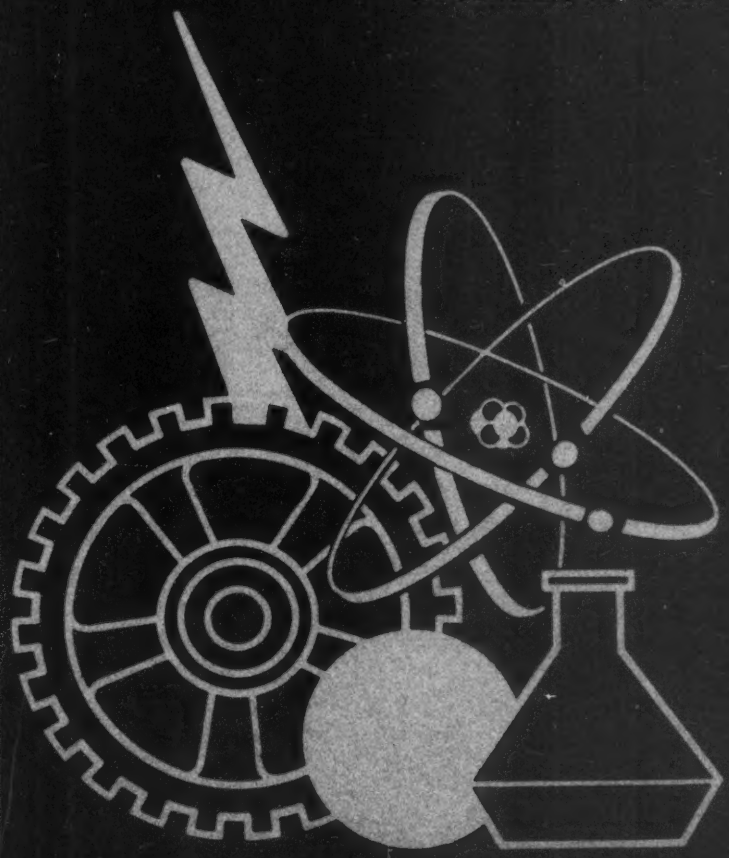
of the

UNITED STATES PATENT AND TRADEMARK OFFICE

Route to:

PATENTS

DECEMBER 12, 1989



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OFFICIAL GAZETTE of the
UNITED STATES PATENT AND TRADEMARK OFFICE

December 12, 1989 Volume 1109 Number 2

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The following are mailed under direction of the Superintendent of Documents, Government Printing Office, Washington, D.C., 20402, to whom all subscriptions should be made payable and all communications addressed.

THE OFFICIAL GAZETTE (PATENT SECTION), issued weekly.
THE OFFICIAL GAZETTE (TRADEMARK SECTION), issued weekly.
GENERAL INFORMATION concerning PATENTS.
GENERAL INFORMATION concerning TRADEMARKS.

COPIES OF PATENTS are furnished by the Patent and Trademark Office at $1.50 each; PLANT PATENTS in color, $10.00 each; copies of TRADEMARKS at $1.50 each. Address orders to the Commissioner of Patents and Trademarks, Washington, D.C., 20231.

Printing authorized by Section 11(a)3 of Title 35, U.S. P.T.O.

PATENT AND TRADEMARK OFFICE NOTICES

Patent Cooperation Treaty (PCT) Information

For information concerning the PCT member countries see the notice appearing in the *Official Gazette* at 1109 O.G. 3 on Dec. 5, 1989.

For use of the European Patent Office as an International Searching Authority for international applications filed in the United States Receiving Office, see the notice appearing in the *Official Gazette* at 1022 O.G. 5 on Sept. 28, 1982.

For use of the European Patent Office as an International Preliminary Examining Authority for international applications filed in the United States Receiving Office, see the notices appearing in the *Official Gazette* at 1080 O.G. 2 on July 7, 1987 and at 1091 O.G. 2 on June 7, 1988.

The search fee of the European Patent Office was changed due to a difference in the exchange rate of the U.S. dollar in relation to the German Mark as of Jan. 1, 1990, and was announced in the *Official Gazette* at 1109 O.G. 3 on Dec. 5, 1989.

International PCT fees were changed on June 1, 1989 due to a difference in the exchange rate of the U.S. dollar in relaton to the Swiss Franc and were announced in the *Official Gazette* at 1102 O.G. 90 on May 30, 1989.

Certain domestic PCT fees and charges for International Search and Preliminary Examination have been changed effective Apr. 17, 1989 and were announced in the *Official Gazette* at 1100 O.G. 24 on Mar. 7, 1989.

The current schedule of PCT fees (in U.S. dollars) is as follows:

Transmittal fee:	170.00
Search Fee	
U.S. Patent and Trademark Office (USPTO) as International Searching Authority (ISA)	
—No corresponding prior U.S. national application filed	550.00
—Corresponding prior U.S. national application filed	380.00
—Supplemental search fee, per additional invention	150.00
European Patent Office as ISA	
—If paid before Jan. 1, 1990	1040.00
—If paid on or after Jan. 1, 1990	1140.00
Preliminary examination fee	
USPTO as International Preliminary Examining Authority (IPEA)	
—Search fee paid to USPTO as ISA.	400.00
—Additional examination fee, per additional invention	130.00
—ISA not the USPTO	600.00
—Additional examination fee, per additional invention	200.00
International fees	
Basic fee	436.00
Basic Supplemental fee (for each page over 30)	9.00
Designation fee per country or region for the first 10 national or regional offices	106.00
Designation fee for 11th and subsequent designations	No Charge
Handling fee	134.00

U.S. National Stage fees

	Small Entity	Regular
USPTO was IPEA	165.00	330.00
USPTO was ISA but not IPEA	185.00	370.00
USPTO was neither ISA nor IPEA	250.00	500.00
USPTO was IPEA and all claims presented satisfied provisions of PCT Article 33(2) to (4)	25.00	50.00
—For each independent claim in excess of 3	18.00	36.00
—For each claim in excess of 20	6.00	12.00
—For each application containing a multiple dependent claim	60.00	120.00
—Surcharge for filing national fee or oath or declaration after the time limit applicable under PCT Article 22 or 39(1)	60.00	120.00
—Processing fee for filing English translation after the time limit applicable under PCT Article 22 or 39(1)	30.00	30.00

Nov. 7, 1989.

JEFFREY M. SAMUELS
Acting Commissioner of Patents and Trademarks.

Notice of Maintenance Fees Payable

Title 37, Code of Federal Regulations, Section 1.362(d), effective Nov. 1, 1984, provides that maintenance fees may be paid without surcharge for a six-month period beginning 3, 7, and 11 years after the date of issue of patents based on application filed on or after Dec. 12, 1980. An additional six-month grace period is provided by 35 U.S.C. 41(b) and 37 CFR 1.362(e) for payment of the maintenance fee with the surcharge set forth in 37 CFR 1.20(k) or (l), as amended effective Apr. 17, 1989. If the maintenance fee is not paid in a patent requiring such payment the patent will expire on the 4th, 8th or 12th anniversary of the patent.

Attention is drawn to the patents which were issued on December 09, 1986, for which maintenance fees due at 3 years and six months may now be paid. The patents have patent numbers within the following ranges:

Utility Patents 4,627,108 through 4,628,542
Reissue Patents based on the above identified patents.

Attention is drawn to the patents which were issued on December 07, 1982 for which maintenance fees due at 7 years and six months may now be paid. The patents have patent numbers within the following ranges:

Utility Patents 4,361,912 through 4,363,139
Reissue Patents based on the above identified patents.

No maintenance fees are required for design or plant patents.

Payments of maintenance fees in patents should be directed to "Commissioner of Patents and Trademarks, Box M. Fee, Washington, D.C. 20231."

The current amounts of the maintenance fees due at 3 years and six months and seven years and six months are set forth in 37 CFR 1.20(e), (f), (h) and (i), as amended effective Apr. 17, 1989, which are reproduced below:

37 CFR § 1.20 Post-issuance fees

"(e) For maintaining an originasl or reissue patent, except a design or plant patent, based on an application filed on or after Dec. 12, 1980 and before Aug. 27, 1982, in force

beyond 4 years; the fee is due by three years and six months after the original grant.....$245.00

"(f) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after Dec. 12, 1980 and before Aug. 27, 1982, in force beyond 8 years; the fee is due by seven years and six months after the original grant.....$495.00"

"(h) For maintaining an original or reissue patent except a design or plant patent, based on an application filed on or after Aug. 27,1982, in force beyond 4 years; the fee is due by three years and six months after the original grant:

By a small entity (§1.9(f)).....$245.00
By other than a small entity.....$490.00"

"(i) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after Aug. 27, 1982, in force beyond 8 years; the fee is due by seven years and six months after the original grant:

By a small entity (§1.9(f)).....$495.00
By other than a small enttity.....$990.00"

The amounts of the surcharges as amended effective Apr. 17, 1989, are set forth in 37 CFR 1.20 (k), (l) and (m) which are reproduced below:

"(k) Surcharge for paying a maintenance fee during the 6-month grace period following the expiration of three years and six months , seven years and six months, and eleven years and six months after the date of the original grant of a patent based on an application filed on or after Dec. 12, 1980 and before Aug. 27,1982.....$120.00

"(l) Surcharge for paying a maintenance fee during the 6-month grace period following the expiration of three years and six months, seven years and six months, and eleven years and six months after the date of the original grant of a patent based on an application filed on or after Aug. 27, 1982:

By a small entity(§1.9(f)).....$60.00
By other than a small entity.....$120.00"

"(m) Surcharge for accepting a maintenance fee after expiration of a patent for non-timely payment of a maintenance fee where the delay is shown to the satisfaction of the Commissioner to have been unavoidable.....$550.00"

Notice of Expiration of Patents Due to Failure to Pay Maintenance Fees

35 U.S.C. 41 and 37 CFR 1.362(g) provide that if the required maintenance fee and any applicable surcharge are not paid in a patent requiring such payment, the patent will expire at the end of the 4th, 8th, or 12th anniversary of the grant of the patent depending on the first maintenance fee which was not paid.

According to the records of the Office, the patents listed below have expired due to failure to pay the required maintenance fee and any applicable surcharge.

PATENTS WHICH EXPIRED SEPTEMBER 24, 1989 DUE TO FAILURE TO PAY MAINTENANCE FEES

Patent Number	Serial Number	Issue Date
4,542,538	06/680,145	9/24/85
4,542,543	06/602,412	9/24/85
4,542,546	06/622,998	9/24/85
4,542,548	06/475,319	9/24/85
4,542,550	06/557,362	9/24/85
4,542,551	06/537,736	9/24/85
4,542,556	06/577,070	9/24/85
4,542,559	06/651,217	9/24/85
4,542,561	06/573,951	9/24/85
4,542,570	06/531,640	9/24/85
4,542,571	06/590,368	9/24/85
4,542,572	06/556,134	9/24/85
4,542,573	06/656,082	9/24/85
4,542,574	06/540,341	9/24/85
4,542,575	06/543,946	9/24/85
4,542,581	06/489,506	9/24/85
4,542,584	06,451,588	9/24/85
4,542,595	06/617,018	9/24/85
4,542,597	06/586,294	9/24/85
4,542,601	06/551,077	9/24/85
4,542,603	06/586,849	9/24/85
4,542,604	06/601,942	9/24/85
4,542,609	06/650,147	9/24/85
4,542,615	06/540,516	9/24/85
4,542,618	06/592,230	9/24/85
4,542,631	06/552,296	9/24/85
4,542,632	06/363,564	9/24/85
4,542,634	06/459,615	9/24/85
4,542,641	06/558,894	9/24/85
4,542,662	06/442,800	9/24/85
4,542,664	06/480,685	9/24/85
4,542,666	06/528,592	9/24/85
4,542,667	06/588,220	9/24/85
4,542,669	06/701,668	9/24/85
4,542,678	06/424,984	9/24/85
4,542,681	06/641,374	9/24/85
4,542,682	06/631,576	9/24/85
4,542,683	06/555,943	9/24/85
4,542,687	06/698,012	9/24/85
4,542,694	06/602,483	9/24/85
4,542,695	06/478,385	9/24/85
4,542,700	06/457,835	9/24/85
4,542,709	06/652,226	9/24/85
4,542,714	06/637,585	9/24/85
4,542,715	06/572,872	9/24/85
4,542,717	06/535,705	9/24/85
4,542,726	06/626,973	9/24/85
4,542,736	06/682,337	9/24/85
4,542,737	06/606,844	9/24/85
4,542,742	06/557,865	9/24/85
4,542,743	06/517,931	9/24/85
4,542,747	06/556,500	9/24/85
4,542,758	06/510,951	9/24/85
4,542,772	06/463,994	9/24/85
4,542,780	06/502,230	9/24/85
4,542,781	06/568,069	9/24/85
4,542,787	06/614,690	9/24/85
4,542,788	06/602,820	9/24/85
4,542,795	06/481,856	9/24/85
4,542,797	06/246,210	9/24/85
4,542,804	06/585,896	9/24/85
4,542,806	06/300,195	9/24/85
4,542,813	06/485,655	9/24/85
4,542,817	06/553,515	9/24/85
4,542,824	06/612,031	9/24/85
4,542,826	06/567,166	9/24/85
4,542,828	06/521,042	9/24/85
4,542,831	06/548,246	9/24/85
4,542,840	06/583,202	9/24/85
4,542,842	06/669,401	9/24/85
4,542,847	06/610,076	9/24/85
4,542,848	06/621,231	9/24/85
4,542,850	06/474,575	9/24/85
4,542,855	06/550,205	9/24/85
4,542,857	06/469,637	9/24/85
4,542,859	06/497,110	9/24/85
4,542,861	06/577,052	9/24/85
4,542,862	06/577,067	9/24/85
4,542,863	06/633,611	9/24/85
4,542,868	06/682,499	9/24/85
4,542,870	06/521,490	9/24/85
4,542,873	06/499,834	9/24/85
4,542,875	06/508,018	9/24/85
4,542,879	06/441,096	9/24/85
4,542,880	06/526,956	9/24/85
4,542,882	06/602,169	9/24/85
4,542,885	06/673,990	9/24/85
4,542,892	06/583,436	9/24/85

Patent Number	Serial Number	Issue Date
4,542,898	06/308,839	9/24/85
4,542,900	06/538,790	9/24/85
4,542,904	06/589,749	9/24/85
4,542,911	06/488,209	9/24/85
4,542,915	06/526,272	9/24/85
4,542,926	06/544,439	9/24/85
4,542,927	06/594,853	9/24/85
4,542,928	06/640,518	9/24/85
4,542,929	06/529,024	9/24/85
4,542,930	06/569,251	9/24/85
4,542,935	06/374,948	9/24/85
4,542,947	06/616,911	9/24/85
4,542,952	06/604,796	9/24/85
4,542,954	06/550,698	9/24/85
4,542,963	06/594,134	9/24/85
4,542,966	06/585,785	9/24/85
4,542,968	06/562,972	9/24/85
4,542,969	06/429,343	9/24/85
4,542,993	06/530,844	9/24/85
4,542,999	06/481,289	9/24/85
4,543,007	06/552,621	9/24/85
4,543,012	06/572,832	9/24/85
4,543,016	06/551,463	9/24/85
4,543,020	06/494,631	9/24/85
4,543,021	06/650,057	9/24/85
4,543,028	06/570,603	9/24/85
4,543,035	06/589,589	9/24/85
4,543,048	06/612,982	9/24/85
4,543,055	06/567,513	9/24/85
4,543,060	06/578,386	9/24/85
4,543,080	06/598,852	9/24/85
4,543,083	06/617,775	9/24/85
4,543,084	06/545,940	9/24/85
4,543,091	06/495,665	9/24/85
4,543,094	06/591,003	9/24/85
4,543,097	06/438,370	9/24/85
4,543,101	06/594,057	9/24/85
4,543,106	06/623,979	9/24/85
4,543,111	06/497,678	9/24/85
4,543,114	06/547,533	9/24/85
4,543,126	06/540,609	9/24/85
4,543,146	06/656,811	9/24/85
4,543,147	06/642,545	9/24/85
4,543,148	06/623,694	9/24/85
4,543,165	06/518,891	9/24/85
4,543,177	06/619,663	9/24/85
4,543,182	06/481,304	9/24/85
4,543,201	06/431,177	9/24/85
4,543,223	06/561,080	9/24/85
4,543,229	06/511,843	9/24/85
4,543,231	06/330,361	9/24/85
4,543,245	06/576,075	9/24/85
4,543,246	06/657,508	9/24/85
4,543,254	06/471,564	9/24/85
4,543,277	06/554,560	9/24/85
4,543,289	06/686,050	9/24/85
4,543,336	06/448,193	9/24/85
4,543,347	06/593,620	9/24/85
4,543,354	06/550,423	9/24/85
4,543,356	06/455,411	9/24/85
4,543,361	06/527,717	9/24/85
4,543,384	06/467,196	9/24/85
4,543,401	06/260,658	9/24/85
4,543,407	06/677,262	9/24/85
4,543,413	06/602,582	9/24/85
4,543,444	06/601,442	9/24/85
4,543,447	06/493,159	9/24/85
4,543,448	06/613,750	9/24/85
4,543,451	06/589,954	9/24/85
4,543,452	06/469,135	9/24/85
4,543,461	06/566,830	9/24/85
4,543,462	06/682,484	9/24/85
4,543,488	06/659,027	9/24/85
4,543,502	06/602,151	9/24/85
4,543,509	06/491,400	9/24/85
4,543,538	06/631,190	9/24/85
4,543,541	06/600,755	9/24/85
4,543,547	06/485,282	9/24/85
4,543,562	06/410,547	9/24/85
4,543,563	06/410,485	9/24/85
4,543,566	06/415,442	9/24/85
4,543,571	06/439,552	9/24/85
4,543,575	06/469,321	9/24/85
4,543,596	06/510,081	9/24/85
4,543,599	06/498,136	9/24/85
4,543,600	06/533,819	9/24/85
4,543,602	06/489,970	9/24/85
4,543,606	06/489,341	9/24/85
4,543,619	06/430,819	9/24/85
4,543,638	06/414,815	9/24/85
4,543,645	06/547,778	9/24/85

REISSUE APPLICATIONS FILED

Notice under 37 CFR 1.11(b). The reissue applications listed below are open to inspection by the general public in the indicated Examining Groups and copies may be obtained by paying the fee therefor (37 CFR 1,21(b)).

4,377,024, Re. S. N. 07/426,462, Filed Oct. 20, 1989, Cl. 029/157, METHOD OF MAKING A HEAT EXCHANGER, Zalman Saperstein, Owner of Record:*Modine Manufacturing Company*, Attorney or Agent: Willaim A. Van Santen, Ex. Gp.: 326

4,661,575, Re. S. N. 07/313,313, Filed Jan. 30, 1989, Cl. 526/283, DICYCLOPENTADIENE POLYMER PRODUCT, Glenn M. Tom, Owner of Record: *Hercules Inc., Wilmington, Del.*, Attorney or Agent: W. Stanley Alexander, Ex. Gp.: 155

4,665,189, Re. S. N. 07/430,697, Filed Nov. 1, 1989, Cl. 548/252, OXIRANES, Stephen Richard Baker, Owner of Record: *Lilly Industries,London, England*, Attorney or Agent: Robert A. Conrad, Ex. Gp.: 129

4,666,969, Re. S. N. 07/428,685, Filed Oct. 30, 1989, Cl. 524/310, RICINOLEATE PLASTICZERS FOR POLYURETHANE COMPOSITIONS, Melvin Brauer, Owner of Record: *Caschem Inc., Bayonne, N.J.*, Attorney or Agent: Stanton T. Lawrence, Ex. Gp.: 155

4,689,542, Re. S. N. 07/397,174, Filed Aug. 8, 1989, Cl. 318/778, METHOD AND APPARATUS FOR CONTROLLING INDUCTION MOTOR, Satoshi Iboi, Owner of Record: *Hitach Keiyo Engineering Co. Ltd.*, Attorney or Agent: Donald R. Antonelli, Ex. Gp.: 217

4,694,829, Re. S. N. 07/410,620, Filed Sept. 21, 1989, Cl. 128/399, THERAPEUTIC STUFFED TOY, Ruth E. Frye, Owner of Record: *Inventor*, Attorney or Agent: Dennis T. Griggs, Ex. Gp.: 334

4,699,877, Re. S. N. 07/421,096, Filed Oct. 12, 1989, Cl. 435/6, METHOD AND COMPOSITIONS FOR DETECING HUMAN TUMORS, Martin J. Cline, Owner of Record: *The Regents of the University of California, Berkeley, Calif.*, Attorney or Agent: Bertram I. Rowland, Ex. Gp.: 183

4,704,612, Re. S. N. 07/430,237, Filed Oct. 31, 1989, Cl. 342/386, SYSTEM FOR RECOVERING A HUNTING ARROW, Dan D. Boy, Owner of Record: *Inventor*, Attorney or Agent: Clifford A. Poff, Ex. Gp.: 222

4,705,723, Re. S. N. 07/428,684, Filed Oct. 30, 1989, Cl. 428/375, PROCESS FOR USING RICINOLEATE PLASTICIZED POLYURETHANES FOR SEALING ELECTRICAL DEVICES, Melvin Brauer, Owner of Record: *Caschem Inc., Bayonne, N.J.*, Attorney or Agent: Stanton T. Lawrence III, Ex. Gp.: 154

4,705,724, Re. S. N. 07/429,118, Filed Oct. 30, 1989, Cl. 428/375, PROCESS FOR USING ESTER PLASTICIZED POLYURETHANES FOR SEALING ELECRIICAL DEVICES,

William J. Downey, Owner of Record: *Caschem Inc., Bayonne, NJ.*, Attorney or Agcnt: Stanton T. Lawrence III, Ex. Gp.: 154

4,747,411, Re. S. N. 07/430,210, Filed Nov. 1, 1989, Cl. 128/660, THREE-DIMENSIONAL IMAGING SYSTEM, Robert S. Ledley, Owner of Record: *National Biomedical Research Founation, Washington, D.C.*, Attorney or Agent: Joseph G. Seeber, Ex. Gp.: 335

4,753,815, Re. S. N. 07/428,491, Oct. 27, 1989, Cl. 426/582, PIZZA PREPARATION FROM COMMINUTED CHEESE, Lester O. Kielsmeier, Owner of Record: *Leprino Food Comany, Denver, Colo.*, Attorney or Agent: Timothy L. Tilton, Ex. Gp.: 132

4,770,996, Re. S. N. 07/428,598, Filed Oct. 30, 1989, Cl. 435/18, IDENTIFICATION OF INDIVIDUALS PREDISPOSED TOWARD ALCOHOL ABUSE, Boris Tabakoff, Owner of Record: *Inventor*, Attorney or Agent: Talivaldis Cepuritis, Ex. Gp.: 182

4,793,933, Re. S. N. 07/428,836, Filed Oct. 30, 1989, Cl. 210/710, WASTE TRATMENT METHOD FOR METAL HYDROXIDE ELECTROPLATING SLUDGES, William Rostoker, Owner of Record: *Rostoker Inc., Burnham, Ill.*, Attorney or Agent: Stanley M. Parmerter, Ex. Gp.: 136

4,801,687, Re. S. N. 07/428,818, Filed Oct. 30, 1989, Cl. 530/387, MONOCLONAL ANTIBODY PURFICATION PROCESS USING PROTEIN A, That T. Ngo, Owner of Record: *Bioprobe International Inc., Tustin, Calif.*, Attorney or Agent: John P. Spitals, Ex. Gp.: 186

REQUESTS FOR REEXAMINATION FILED

Notice under 37 CFR 1.11(c). The requests for reexamination listed below are open to inspection by the general public in the indicated Examining Groups. Copies of the requests and related papers may be obtained by paying the fee therefor established in the Rules (37 CFR 1.19(a)).

In the event correspondence to the patent owner is not received, this notice will be considered to be constructive notice to the patent owner and reexamination will proceed (37 CFR 1.248(a)(5) and 1.525(b).

4,060,066, Reexam. No. 90/001,881, Requested Nov. 3, 1989, Cl. 124/23, COMPOUND ARCHERY BOW WITH ECENCTRIC CAM ELEMENTS, Donald S. Kudlacek, Owner of Record: *Inventor, Longview, Wash.* Attorney or Agent: Unknown, Ex. Gp.: 330, Requester: Browning, Morgan, Utah

4,703,336, Reexam. No. 90/001,882, Requested Nov. 1, 1989, Cl. 357/30, PHOTODETECTION AND CURRENT CONTROL DEVICES, Stanford R. Ovshinsky, et al., Owner of Record: *Energy Conservation Devices, Inc., Troy, Mich.*, Attorney or Agent: Marvin S. Siskind, Ex. Gp.: 250, Requester: Hoffman, Wasson & Fallow, Alington, Va.

4,755,653, Reexam. No. 90/001,880, Requested Nov. 2, 1989, Cl. 219/358, HEATER WITH ALERT INDICATOR, Donald L. Townsend, et al., Owner of Record: *Arvin Industries, Inc. Columbus, Ind.*, Attorney or Agent: Barnes & Thornburg, Ex. Gp.: 210, Requester: Owner

4,823,411, Reexam. No. 90/001,879, Requested Nov. 2, 1989, Cl. 4/255, CLEANOUT EXTENSION ADAPTER, Hans Nettel, Owner of Record: *Inventor, San Diego, Calif.*, Attorney or Agent: F. E. Baker, Ex. Gp.: 240, Requestrer: Plastic Oddities, Inc., Shelby, N. C.

Service by Publication

A petition to cancel each of the registrations identified below having been filed, and the notice of such proceedings sent by certified mail to registrant at the last known address having been returnrd by the Postal Service as undeliverable, notice is hereby given that unless the registrants listed herein, their assigns or legal representatives shall enter an appearance within thirty days from the date of this publication, the cancellation will be proceeded with as in the case of default.

Frank R. Anderson, Chicago, Ill., Reg. No. 1,037,976, for the mark "BENCHMARK", Canc. No. 17,470.

KSR Musicware, Inc., Menlo Park, Calif., Reg. No. 1,353,767, for the mark "SCORE 1", Canc. No. 17,591.

Zara Foods, Inc., Ephrata, Pa., Reg, No. 1,470,273, for the mark "SUPERNACHOS", and design, Canc. No. 17,613.

Mr. Battery, Inc., Miami, Fla., Reg. No. 1,071,332, for the mark "MISTER BATTERY", Canc. No. 17,646.

Dave Pelz Golf Research, Inc., Abilene, Tex., Reg. No. 1,416,755, for the mark "FEATHERLITE", Canc. No. 17,459.

Fashion Model of the Year, Inc., New York, N. Y., Reg. No. 1,397,993, for the mark "MODEL OF THE YEAR" (stylized), Canc. No. 18,118.

Howard W. Wilson, Newport Beach, Calif., Reg. No. 916,893, for the mark "GIFTS PLUS", Canc. No. 18,146.

Mannan Foods Co., Ltd., Beverly Hills, Calif., Reg. No. 1,286,806, for the mark "NUTRI-MANNAN", Canc. No. 18,149.

Halle Industries, Inc., Marion, Ind., Reg. No. 325,200, for the mark "DELTA" and design, Canc. No. 18,186.

ERMA S. BROWN
Administrator of the Trademark Trial and Appeal Board
For JEFFREY M. SAMUELS
Assistant Commissioner for Trademarks

Patents Available for License or Sale

Inquires about the patents listed below should be directed to: Patent Counsel, GE Appliances, General Electric Company, Appliance Park 2-226, Louisville, Ky. 40225.

4,318,519	WASHING MACHINE HOSE GUIDE
4,474,017	METHOD OF ASSEMBLING AN ANTI-SWEAT HEATER IN REFRIGERATOR CABINET
4,474,038	DRIVE SYSTEM FOR AUTOMATIC CLOTHES WASHING MACHINE
4,643,663	MOLDING APPARATUS
4,664,608	ROTARY COMPRESSOR
4,786,799	POWER CONTROL FOR COOKING APPLIANCE WITH MULTIPLE HEATING UNITS
4,787,956	FRICTION WELDING APPARATUS
4,788,398	TEMPATURE SENSOR FAILURE DETECTION ARRANGEMENT USING A ENERGY HEATER COUNTER
4,788,415	DUAL BIMETAL POWER CONTROL SWITCHING ARRANGEMENT FOR ELECTRONICALLY CONTROLLED APPLIANCES
4,812,624	TEMERATURE SENSOR ASSEMBLY FOR AN AUTOMATIC SURFACE UNIT
4,822,117	REFRIGERATOR CASE/LINER INTERFACE AND RELATED COMPONENTS FOR AUTOMATED ASSEMBLY

4,226,112 WEB-CUTTING PROCESS, William P. Niedermeyer, 1024 Mount Mary Drive, Green Bay, Wisc. 54301

4,576,178 AUDIO SIGNAL GENERATOR, David Johnson, Box 68, 436 East 69th Street, New York, N. Y. 10021

PATENT NOTICES

Certificates of Correction For Week of December 12, 1989

PP. 06,528	4,790,397	4,805,656	4,817,095
PP. 06,760	4,790,967	4,806,205	4,818,340
Re. 32,866	4,791,166	4,806,519	4,818,571
4,485,869	4,791,305	4,806,526	4,818,933
4,491,000	4,791,493	4,806,718	4,819,122
4,586,700	4,791,537	4,806,906	4,819,208
4,625,592	4,791,640	4,807,069	4,819,508
4,680,084	4,792,019	4,809,046	4,819,759
4,701,000	4,795,710	4,809,223	4,820,522
4,726,740	4,795,921	4,809,237	4,820,649
4,737,184	4,796,102	4,809,828	4,820,754
4,738,223	4,796,137	4,810,469	4,821,099
4,747,271	4,796,318	4,810,738	4,821,129
4,757,380	4,796,792	4,810,824	4,821,824
4,760,419	4,797,073	4,810,923	4,821,981
4,762,839	4,797,306	4,811,002	4,823,275
4,770,488	4,797,642	4,811,021	4,823,594
4,772,916	4,798,544	4,811,105	4,824,414
4,775,625	4,799,186	4,811,302	4,824,584
4,779,198	4,799,308	4,812,986	4,824,787
4,780,311	4,799,433	4,813,053	4,824,927
4,780,540	4,799,489	4,813,706	4,825,092
4,782,091	4,799,495	4,813,937	4,825,630
4,782,625	4,799,695	4,813,966	4,826,095
4,783,884	4,800,202	4,814,095	4,826,303
4,783,898	4,800,482	4,814,322	4,827,154
4,784,580	4,801,830	4,814,519	4,827,211
4,785,086	4,803,117	4,814,592	4,827,824
4,786,947	4,803,679	4,814,890	4,828,442
4,787,947	4,803,726	4,814,892	4,828,476
4,788,120	4,803,839	4,815,071	4,828,583
4,788,174	4,803,962	4,815,605	4,829,215
4,788,465	4,804,204	4,816,268	4,831,181
4,788,924	4,804,494	4,816,432	4,831,380
4,789,630	4,804,518	4,816,546	4,832,164
4,789,807	4,804,765	4,816,736	4,835,215
4,789,851	4,805,087	4,816,866	4,837,479

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PATENT APPLICATION	New patent application and associated papers and fees.
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Since there are variations in the scope of patent collections among the PDLs and in their hours of service to the public, anyone contemplating use of the patents at a particular library is urged to contact that library, in advance, about its collection and hours in order to avert possible inconvenience.

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	Birmingham Public Library	(205) 226-3680
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	Milwaukee Public Library	(414) 278-3247

PATENT EXAMINING CORPS

JAMES E. DENNY, Acting Assistant Commissioner
STEPHEN G. KUNIN, Acting Deputy Assistant Commissioner
CONDITION OF PATENT APPLICATIONS AS OF October 21, 1989

PATENT EXAMINING GROUPS	Actual Filing Date of Oldest New Case Awaiting Action
CHEMICAL EXAMINING GROUPS	
GENERAL METALLURGICAL, INORGANIC, PETROLEUM AND ELECTRICAL CHEMISTRY, AND ENGINEERING, GROUP 110—D. E. TALBERT, Director	5-26-87
ORGANIC CHEMISTRY GROUP 120—S. N. ZAHARNA, Director	6-16-87
SPECIALIZED CHEMICAL INDUSTRIES AND CHEMICAL ENGINEERING, GROUP 130—R. V. FISHER, Acting Director	4-15-87
HIGH POLYMER CHEMISTRY, PLASTICS, COATING, PHOTOGRAPHY, STOCK MATERIALS AND COMPOSITIONS, GROUP 150—J. O. THOMAS, Director	5-14-87
BIOTECHNOLOGY, GROUP 180—J. E. KITTLE, Director	1-20-87
ELECTRICAL EXAMINING GROUPS	
INDUSTRIAL ELECTRONICS, PHYSICS AND RELATED ELEMENTS, GROUP 210—D. G. Kelly, Director	10-15-87
SPECIAL LAWS ADMINISTRATION, GROUP 220—K. L. CAGE, Director	2-27-87
INFORMATION PROCESSING, STORAGE, AND RETRIEVAL, GROUP 230—G. GOLDBERG, Director	5-28-87
PACKAGES, CLEANING, TEXTILES, AND GEOMETRICAL INSTRUMENTS, GROUP 240—TRYGVE M. BLIX,Director	5-27-88
ELECTRONIC AND OPTICAL SYSTEMS AND DEVICES, GROUP 250—EDWARD E. KUBASIEWICZ, Director	8-18-87
COMMUNICATIONS, MEASURING, TESTING AND LAMP/DISCHARGE GROUP, GROUP 260 STEWART LEVY, Acting Director	9-21-87
DESIGN, GROUP 290—K. L. CAGE, Director	2-6-86
MECHANICAL EXAMINING GROUPS	
HANDLING AND TRANSPORTING MEDIA, GROUP 310—B. R. GRAY, Director	10-21-88
MATERIAL SHAPING, ARTICLE MANUFACTURING AND TOOLS, GROUP 320—N. GODICI, Acting Director	4-13-88
MECHANICAL TECHNOLOGIES AND HUSBANDRY PERSONAL TREATMENT INFORMATION, GROUP 330—J. J. LOVE, Director	4-20-87
SOLAR, HEAT, POWER, AND FLUID ENGINEERING DEVICES, GROUP 340—C. CROYLE, Acting Director	2-26-88
GENERAL CONSTRUCTIONS, PETROLEUM AND MINING ENGINEERING, GROUP 350—A. L. SMITH, Director	1-3-89

Expiration of patents: The patents within the range of numbers indicated below expire during October 1989, except those which may have had their terms curtailed by disclaimer under the provisions of 35 U.S.C. 253. Other patents, issued after the dates of the range of numbers indicated below, may have expired before the full term of 17 years for the same reasons, or have lapsed under the provisions of 35 U.S.C. 151.

Patents ..... Numbers 3,694,814 to 3,702,011 inclusive
Plant Patents ..... None

REEXAMINATIONS

DECEMBER 12, 1989

Matter enclosed in heavy brackets [ ] appears in the patent but forms no part of this reexamination specification; matter printed in italics indicates additions made by reexamination.

B1 3,730,483 (1166th)
ASSEMBLY FOR PULLING A LINE
E. Strohm Newell, San Diego, Calif.
Reexamination Request No. 90/001,421, Jan. 11, 1988.
Reexamination Certificate for Patent No. 3,730,483, issued May 1, 1973, Ser. No. 165,763, Jul. 15, 1971.
Continuation of Ser. No. 105,161, Jan. 11, 1971, abandoned.
Int. Cl.[4] B66D *1/30*
U.S. Cl. 254—371

AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

The patentability of claims **1–9** is confirmed.

1. An assembly for pulling a line comprising:
a. a capstan member and a pulley member rotatably mounted around a stationary center post,
b. said pulley member having an annular groove and mounted to rotate with said capstan member, and
c. line guide means including a gate portion to direct the movement of the line from the capstan member onto said pulley member,
d. said line guide means being disposed in fixed relationship with respect to the capstan and pulley members,
e. the gate portion includes a disk member disposed between the rotatably mounted capstan member and a pulley member, and
f. the line guide means includes a bracket portion extending from the disk member to the center post to fix the position of the disk member with respect to the rotatable capstan and pulley members.

B1 4,449,182 (1167th)
INTERFACE BETWEEN A PAIR OF PROCESSORS SUCH AS HOST AND PERIPHERAL-CONTROLLING PROCESSORS IN DATA PROCESSING SYSTEMS
Barry L. Rubinson; Edward A. Gardner; William A. Grace; Richard F. Lary, and Dale R. Keck, all of Colorado Springs, Colo., assignors to Digital Equipment Corporation, Maynard, Mass.
Int. Cl.[4] G06F *9/46, 15/16*
U.S. Cl. 364—200

AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

Claims **1–10, 13–18** and **21** are cancelled.

Claims **11, 12, 19** and **20** are determined to be patentable as amended.

New claims **22–28** are added and determined to be patentable.

11. [The apparatus of claim **10**] *In a data processing system which includes first and second processors (70 and 31), a memory (80) adapted to be used by said processors for containing information to be shared by the processors, and the bus means (60) for interconnecting the first and second processors and the memory, the bus means (60) being of the type which has no hardware interlock capability which is usable by each of said processors to selectively prevent the other of said processors from accessing at least a portion of said memory, the improvement comprising:*
the first and second processors (70 and 31) being adapted to employ a portion (80A) of said memory as a communications region accessible by both of said processors, so that all commands and responses can be transmitted from one of said processors to the other of said processors through such portion of memory;
the communications region of memory including a pair of ring buffers (80D and 80E);
a first one of said ring buffers (80D) buffering the transmission of messages issued by the first processor (70) and a second one of said ring buffers (80E) buffering the reception of messages transmitted by the second processor (31);
each of said ring buffers including a plurality of memory locations (e.g., 132, 134, 136 and 138) adapted to receive from the associated transmitting one of said processors a descriptor signifying another location in said memory;
for said first ring buffer, the location signified by such descriptor being a location containing a message for transmission to the second processor;
for said second ring buffer, the location signified by such descriptor being a location for storing, at least temporarily, a message from the second processor;
wherein said ring buffers are adapted to permit the first processor to send a plurality of commands in sequence to the second processor via the bus means, and to permit the second processor to send responses to those commands to the first processor via the bus means;
means for limiting the generation of processor interrupt requests to the first processor in connection with the sending of commands and receipt of responses by said processor, such that interrupt requests to said processor are generated substantially only when an empty ring buffer becomes not-empty and when a full ring buffer becomes not-full; and
wherein the size of each ring buffer is communicated by said first processor to the second processor at the time of initializing a communications path between them;
the first and second processors (70 and 31) further being adapted to control access to said communications region (80A) such that information written therein by one of said processors may not be read twice by the other processor and a location where information is to be written by one of the processors may not be read by the other processor before said information has been written;
so that race conditions are prevented from developing across said bus means in the course of interprocessor communications, and messages are transmitted from said ring buffers in the same sequence as that in which they are issued by the processors, while each of the processors is permitted to operate at its own rate, with substantial independence from the other processor.

B1 4,499,591 (1168th)
FLUOROSCOPIC FILTERING
Gary Hartwell, Troy, Va., assignor to The University of Virginia Alumni Patents Foundation
Reexamination Request No. 90/001,664, Dec. 12, 1988.
Reexamination Certificate for Patent No. 4,499,591, issued Feb. 12, 1985, Ser. No. 442,318, Nov. 17, 1982.
Int. Cl.[4] A61B *6/00*
U.S. Cl. 378—62

AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

Claims **1–3, 7–9** and **11** are determined to be patentable as amended.

Claims **4–6, 10** and **12**, dependent on an amended claim, are determined to be patentable.

9. A method for limiting the radiation dosage to an examination object comprising the steps of,

emitting a beam of penetrating radiation from a source of radiation toward the examination object,

positioning a filter material a preselected distance from the source of radiation and the examination object between the source of radiation and the examination object,

providing a filter material having a preselected thickness in the range between about 100 microns and 250 microns and selected from the group of [rare earth] metals consisting essentially of *rare earth metals,* yttrium, zirconium[,] *and* niobium[, and molybdenum],

obstructing radiation beam photon energy of 20 keV and less by the filter material,

permitting photon energy of the radiation beam above 20 keV to pass through the examination object,

detecting the filtered radiation emerging from the examination object, and

processing the emerging filtered radiation to provide a radiographic image of the examination object corresponding to the intensity of the emerging filtered radiation.

B1 4,515,759 (1169th)
PROCESS OF REMOVING HYDROGEN SULFIDE FROM GAS MIXTURES
Edward E. Burnes, Arroyo Grande, Calif., and Kishan Bhatia, Katy, Tex., assignors to NL Industries, Inc., New York, N.Y.
Reexamination Request Nos. 90/001,066, Aug. 14, 1986 and 90/001,598, Sep. 2, 1988.
Reexamination Certificate for Patent No. 4,515,759, issued May 7, 1985, Ser. No. 549,274, Nov. 3, 1983.
Filed Aug. 14, 1986, Ser. No. 549,274
Int. Cl.[4] B01D *53/34*
U.S. Cl. 423—220

AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

Claims **2, 3, 5,** and **6** are cancelled.

Claims **1, 7,** and **8** are determined to be patentable as amended.

Claims **4** and **9**, dependent on an amended claim, are determined to be patentable.

1. A process for *selectively* removing hydrogen sulfide from a gas mixture comprising treating [said] *a* gas mixture *comprising natural gas, hydrogen sulfide and carbon dioxide* with an aqueous medium containing [an effective amount of a inorganic water soluble metal] *sodium* nitrite, *said aqueous medium being buffered to* [at] a pH of about 5.5 or greater.

B1 4,734,897 (1170th)
CASSETTE ADAPTER FOR PLAYBACK DEVICE SUCH AS A COMPACT DISK PLAYER
Larry Schotz, Cedarburg, Wis., assignor to Recoton Corporation
Reexamination Request No. 90/001,691, Jan. 17, 1989.
Reexamination Certificate for Patent No. 4,734,897, issued Mar. 29, 1988, Ser. No. 890,355, Jul. 25, 1986.
Continuation-in-part of Ser. No. 797,706, Nov. 13, 1985, abandoned.
Int. Cl.[4] H04B *1/20*
U.S. Cl. 369—2

AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

The patentability of claims **7–19** is confirmed.

Claim **6** is cancelled.

Claims **1** and **5** are determined to be patentable as amended.

Claims **2–4**, dependent on an amended claim, are determined to be patentable.

New claims **20–24** are added and determined to be patentable.

1. An adapter for enabling the signals produced by a device of the type having a headphone jack to be reproduced as audio sounds by a cassette player audio system of the type having a cassette playback deck in systems of the front-loading and side-loading types wherein said cassette is normally disposed and positioned in use substantially completely within the confines of said cassette playback deck and wherein said playback decks include a pair of spaced reel-drive spindles and a playback head, said adapter comprising: a housing of a configuration of a cassette normally used with said playback deck, said housing having at least a pair of openings to receive said pair of reel-drive spindles associated with said playback deck; a record head supported in said housing in a position for contacting the playback head of said playback deck when said adapter is received in said playback deck; audio circuit means within said housing and electrically connected to said record head for providing audio signals to said record head; electrical conducting means having one end coupled to said audio circuit means within said adapter and extending [form] *from* said adapter, said electrical conducting means being coupled at its other end

to a plug compatible with the headphone jack of said device; said electrical conducting means being movable *after final assembly of said adapter for consumer use* between a first position such that said adapter may be used with a playback deck of the front-loading type and a second position such that said adapter may be used with a play back deck of the side-loading type so that said electrical conducting means when said adapter is positioned in such playback deck passes out of said playback deck free of interference with said playback deck; whereby when said adapter is received by said playback deck and said plug is connected to said headphone jack, the signals produced by said device are applied to said record head and applied thereby to said playback head and thence reproduced by said audio system.

REISSUES

DECEMBER 12, 1989

Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates additions made by reissue.

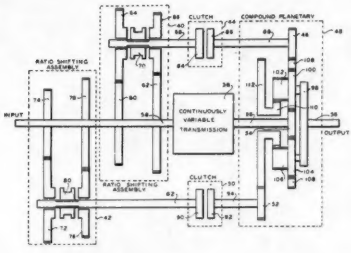
Re. 33,126
GEAR ASSISTED CONTINUOUSLY VARIABLE TRANSMISSION

Ernest C. Wittke, 585 Bloomfield Ave., Apt. 40, West Caldwell, N.J. 07006

Original No. 4,682,511, dated Jul. 28, 1987, Ser. No. 788,869, Oct. 18, 1985. Application for reissue Oct. 5, 1988, Ser. No. 253,989

Int. Cl.[4] F16H *37/06*

U.S. Cl. 74—681 10 Claims



1. A transmission system comprising:

a plurality of power transmission paths;

a continuously variable speed ratio transmission in one of said paths having a first input means adapted to be driven by an external prime mover, and a first output means;

a first ratio changing mechanism having a second input means adapted to be driven by said prime mover and having a second output means;

a second ratio changing mechanism having a third input means adapted to be driven by said prime mover and having a third output means, at least one of said ratio changing mechanisms having a plurality of selective ratios [other than zero] selectively engageable in a respective path;

a compound planetary mechanism including fourth, fifth and sixth input means, and a fourth output means providing an output from said transmission system, said first output means being coupled to said fourth input means, said second output means being coupled to said fifth input means, and said third output means being coupled to said sixth input means;

first coupling means for selectively engaging and disengaging one of said paths between said prime mover and said fifth input means, and second coupling means for selectively engaging and disengaging another of said paths between said prime mover and said sixth input means; and

control means for disengaging one of said first and second coupling means in one of said paths when the other of said coupling means is engaged in the other of said paths, said control means providing a selection of ratios of said first and second ratio changing mechanisms such that the ratio of said continuously variable transmission can be alternately decreased and increased respectively with alternate successive ratios of said first and second ratio changing mechanisms without resetting of said continuously variable transmission ratio during the changing of said ratios.

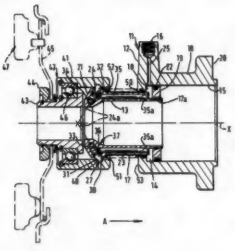
Re. 33,127
CLUTCH RELEASE MECHANISM

Maurice J. Wimbush, Whitnash, England, assignor to Automotive Products plc, Leamington Spa, England

Original No. 4,691,814, dated Sep. 8, 1987, Ser. No. 855,719, Apr. 25, 1986. Application for reissue Jun. 1, 1988, Ser. No. 200,976

Int. Cl.[4] F16D *25/00*

U.S. Cl. 192—91 A 13 Claims



1. A clutch release mechanism for a pull-type clutch including a fluid actuator having an actuator member movable by fluid pressure in a clutch release direction to release the clutch, a release bearing assembly for connection to part of the clutch, and coupling means for connecting the release bearing assembly to the actuator, said coupling means comprising a latch member [movable by fluid pressure], *resilient bias means for biasing the latch member in a direction* transverse to said direction of clutch release [and], latch engaging means *and a fluid pressure movable element co-operable with said latch member* whereby in a first condition the latch member [occupies a position in which it engages the latch engaging means and locks] *is biased by said bias means into a position in engagement with said latch engaging means and is locked in said position by said fluid pressure movable element thereby locking* the release bearing assembly *by fluid pressure* axially to the actuator member so that clutch release force applied by said actuator member is transmitted to the release bearing assembly through the latch member to release the clutch, and in a second condition the latch member is disengageable from the latch engaging means to allow axial separation and coupling of the release bearing assembly and the actuator member.

Re. 33,128
PAPERBOARD CONTAINER FOR LIQUIDS INCLUDING MEANS TO PREVENT FITMENT ROTATION

Duane M. Nordstrom, Kelso, Wash., assignor to Longview Fibre Company, Longview, Wash.

Original No. 46,660,593, dated May 19, 1987, Ser. No. 766,535, Aug. 19, 1985. Application for reissue Apr. 18, 1988, Ser. No. 182,716

Int. Cl.[4] B65D *90/04*

U.S. Cl. 220—465 6 Claims

1. A container for liquids, comprising:

(a) an upright tubular wall open at its top and bottom ends,

(b) a bottom inner cap member closing the bottom end of the tubular wall,

(c) a plurality of peripheral flaps extending outwardly from the inner cap member and arranged to extend along the inner side of the tubular wall,

(d) registering fitment openings through one of the periph-

eral flaps of the bottom inner cap member and through the tubular wall,

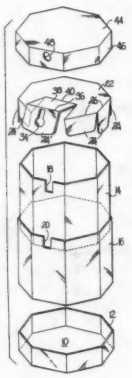
(e) a flexible liquid impervious liner in the interior of the tubular wall,

(f) a fitment on the liner extending outwardly through the registering fitment openings in the flap and wall, the fitment having opposed flat external longitudinal surfaces and one or both of the registering openings in the flap and wall being configured to receive said flat external surfaces of the fitment to prevent rotation of the fitment,

(g) a bottom outer cap member covering the inner cap member and having a peripheral wall extending along the outer bottom side portion of the tubular wall,

(h) a fitment opening in the peripheral wall of the bottom outer cap member receiving the fitment therethrough, and

(i) a top cap member closing the top end of the tubular wall and having a peripheral wall extending along the outer top side portion of the tubular wall.



6. A container for liquids, comprising:

(a) an upright tubular wall open at its top and bottom ends,

(b) a bottom cap member closing the bottom end of the tubular wall,

(c) a plurality of peripheral flaps extending outwardly from the bottom cap member and arranged to extend along the inner side of the tubular wall,

(d) registering fitment openings through one of the peripheral flaps of the bottom cap member and through the tubular wall,

(e) a flexible liquid impervious liner in the interior of the tubular wall,

(f) a fitment on the liner extending outwardly through the registering fitment openings in the flap and wall, the fitment having opposed flat external longitudinal surfaces and one or both of the registering openings in the flap and wall being configured to receive said flat external surfaces of the fitment to prevent rotation of the fitment, and

(g) a top cap member closing the top end of the tubular wall.

Re. 33,129

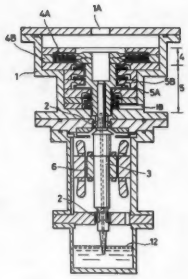
VACUUM PUMP

Mashiro Mase, Nogi; Takashi Nagaoka, Chiyoda; Yoshitsugu Tsutsumi, Nogi; Minoru Taniyama, Nogi, and Makoto Terajima, Nogi, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Original No. 4,668,160, dated May 26, 1987, Ser. No. 855,432, Apr. 24, 1986. Application for reissue Aug. 26, 1987, Ser. No. 90,044

Int. Cl.[4] F01D *1/36*

U.S. Cl. 415—90 **10 Claims**



4. A vacuum pump comprising: a housing including a suction and exhaust openings, a rotating shaft rotatably supported in said housing, a plurality of fixed members attached to an inner wall of said housing, and a plurality of rotating members attached to said rotating shaft, said fixed members and said rotating members being disposed alternately so as to form pump stages in which a centrifugal compressor stage is formed on a side of said suction opening and a circumferential pump stage is formed in a side of said exhaust opening, said rotating member of said centrifugal compressor stage including impellers having a plurality of backward vanes, and wherein said fixed member of said centrifugal compressor stage includes the fixed disc plate with a plurality of vanes disposed so as to face the reverse side of said impeller and inwardly directed relative to the direction of rotation of an outside diametral portion of said fixed member.

PLANT PATENTS

GRANTED DECEMBER 12, 1989

Illustrations for plant patents are usually in color and therefore it is not practicable to reproduce the drawing.

7,068

ALMOND TREE, "LODI"

Irwin H. Bonds, P.O. Box 1698, Twain Harte, Calif. 95383

Filed Dec. 5, 1988, Ser. No. 280,226
Int. Cl.[4] A01H *5/00*
U.S. Cl. Plt.—30 1 Claim

1. A new and distinct variety of almond tree, substantially as illustrated and described which is somewhat similar to the Nonpareil Almond Tree (unpatented), but from which it is distinguished therefrom and characterized principally as to novelty by its compatibility with Marianna 2624 rootstock and which further yields a very heavy crop from season to season, the variety producing a crop which consists of a distinctively flavored kernel having a pronounced, aromatic, very slightly bitter almond flavor, the variety ripe for harvesting and ahipment approximately September 1 under the ecological conditions prevailing in Hickman, Calif.

7,069

PEACH TREE NAMED LADY NANCY

Medio DeMarco, 325 N. White Horse Pike, Hammonton, N.J. 08037

Filed Jan. 13, 1989, Ser. No. 296,691
Int. Cl.[4] A01H *5/00*
U.S. Cl. Plt.—42 1 Claim

1. A new and distinct variety of peach tree, substantially as herein shown and described, characterized particularly as to novelty by the unique combination of large size, very vigorous, open, spreading, vase shaped, regular bearing tree, producing freestone fruit having white flesh with a yellow suture line, moderate winter hardiness and greater firmness than other white peaches, providing excellent shipping quality, superior flavor and earlier ripening than the variety 'Rio Oso Gem'.

7,070

PEACH TREE (CROWN PRINCESS)

Norman G. Bradford, 11875 E. Savana Rd., and Lowell G. Bradford, 12439 E. Savana Rd., both of Le Grand, Calif. 95333

Filed Jan. 9, 1989, Ser. No. 294,822
Int. Cl.[4] A01H *5/00*
U.S. Cl. Plt.—43 1 Claim

1. A new and distinct early ripening variety of clingstone peach tree, substantially as illustrated and described, which most nearly resembles the Merrill Gemfree (U.S. Pat. No. P.P. 1,409) peach variety by producing fruit that matures at nearly the same time, but is distinguished from and an improvement on that variety by having almost full red skin color at ripening time, by being extremely firm and non-melting in texture, by being clingstone in type, and by having a more desirable oblate shape.

7,072

AMELANCHIER CANDENSIS "WHITE PILLAR"

William Flemer, III, Princeton, N.J., assignor to Newplant Associates, Princeton, N.J.

Filed Jun. 13, 1988, Ser. No. 206,412
Int. Cl.[4] A01H *5/00*
U.S. Cl. Plt.—51 1 Claim

1. A new and distinct variety of *Amelanchier canadensis* tree substantially as herein shown and described, characterized particularly as to novelty by its very narrow, upright growth, dark green foliage which is much more resistant to defoliation by leaf spot fungi, in warm, humid weather than other seedlings of the variety, its blooms, which though small are so densely borne as to hide the branches, and glowing mixture of red and purple shades of leaves in the fall.

7,073

GORDON'S GIFT BERMUDA GRASS

Louis R. Gordon, P.O. Box 516, Bethany, Okla. 73008-0516

Filed Dec. 5, 1988, Ser. No. 280,228
Int. Cl.[4] A01H *5/00*
U.S. Cl. Plt.—88 1 Claim

1. A new variety of Bermuda grass as shown and described in this application.

7,074

ZOYSIA JAPONICA GRASS PLANT ZT-11

Hubert F. Whiting, 7636 Madera Ave., Hesperia, Calif. 92345

Filed Dec. 9, 1988, Ser. No. 282,461
Int. Cl.[4] A01H *5/00*
U.S. Cl. Plt.—88 1 Claim

1. A new and distinct variety of grass plant, Zoysia ZT-11 as herein described and illustrated.

PATENTS

GRANTED DEC. 12, 1989

ERRATA

For CLASS	See PATENT NO.
060-547	4,885,982
165-104	4,886,048
188-002	4,886,134
182-146	4,886,139
222-379	4,886,186
249-196	4,886,234
340-980	4,886,328
051-165	4,886,529
264-063	4,886,556
502-211	4,886,582
562-015	4,886,628
562-826	4,886,629
252-067	4,886,855
525-439	4,886,875
514-381	4,886,885
558-343	4,886,936
178-018	4,886,941
355-323	4,887,060
358-021	4,887,252

PATENTS

GRANTED DECEMBER 12, 1989

GENERAL AND MECHANICAL

4,885,805

APPAREL WITH CARRIERS FOR NECK-WEAR

Billie M. Mason, Glencoe, Ill., assignor to Wild West Artwear, Inc., Glencoe, Ill.

Filed Oct. 18, 1988, Ser. No. 259,248
Int. Cl.[4] A41D *27/08*
U.S. Cl. 2—244 **4 Claims**

1. An article of collarless body apparel, which has a neck opening and may be worn with a discrete elongate neck-wear item, the said article comprising in combination

a body portion of a pliant material and having a front and a back;

a neckband

defining the neck opening and

being, in front-to-back orientation of the article, symmetrical; and,

a plurality of spaced elongate loop-like carrier elements on the body portion proximate the neckband and adapted optionally to receive and to cooperate in carrying a said neck-wear item;

whereon the carrier elements are symmetrically disposed relative to and define a course circumferential of the neckband; the course has a length generally corresponding to at least a portion of the length of said neck-wear item; each carrier element comprises a strip; the neckband and the strips are of the same pliant material as the body portion; the strips are of substantially equal length; and, each strip is generally normal to the neckband, has relative to the neckband a proximal end-portion and a distal end-portion, and is attached to the body portion by stitching at the proximal end-portion and at the distal end-portion.

4,885,806

FACE PROTECTIVE MEMBER FOR BATTER'S HELMETS

Denis W. Heller, P.O. Box 1011, Tualatin, Oreg. 97062

Continuation of Ser. No. 126,232, Nov. 27, 1987, abandoned. This application Feb. 10, 1989, Ser. No. 309,997
Int. Cl.[4] A63G *71/10*
U.S. Cl. 2—423 **3 Claims**

1. A batter's helmet comprising:

a domed shell shaped to fit the head of a batter and arranged to protect the upper portion of the head, a downwardly extending ear flap on at least one side of said domed shell arranged to protect the ear and a portion of the neck,

a face protective member comprising a shield plate having opposite ends and being arranged to protect one side only of a batter's face,

and support means supporting said shield plate at one of its ends on said ear flap,

said support means comprising a base member secured to the ear flap of said helmet,

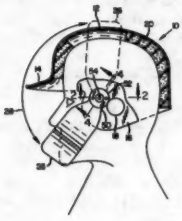
latch means on said base member directed outwardly from said helmet,

a disc member,

means securing said disc member to said shield plate for rotation therewith between two positions of said shield plate comprising a forwardly extending down position which protects the side of the batter's face and an up position overlying an upper portion of said helmet,

said shield plate being dimensioned in width such that in its down forwardly extending position it protects the face but is spaced sufficiently low from the batter's eyes to allow side vision,

latch means on said disc member directed inwardly toward said helmet and having cooperative engagement with the latch means on said base member,



spring means normally urging said base member and disc member together and providing a positive, non-rotative locked engagement of the latch means on said disc member with the latch means on said base member in each of the two positions of said shield plate,

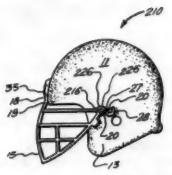
and a finger grip end on said shield plate at said disc member arranged to be grasped by the batter and pulled outwardly against the force of said spring means to disengage the latch means on said disc member from the latch means on said base member to allow said shield plate to be rotated from one locked position to the other.

4,885,807

QUICK RELEASE FACE MASK FOR USE WITH CONTACT SPORTS HELMETS

Paul D. Snow, Jr., 608 Vermont Ave., Ft. Walton Beach, Fla. 32548

Filed Jul. 9, 1987, Ser. No. 71,419
Int. Cl.[4] A42B *3/02*
U.S. Cl. 2—424 **3 Claims**



1. A face mask release apparatus for a rounded contact sports helmet having forehead and left and right temple areas comprising:

a. a face mask having three attachment portions including left and right side attachments adapted for placement at the left and right temple areas of the helmet and a central upper attachment generally between the left and right side attachments and adapted for attachment to the center forehead area of the helmet;

b. a plurality of posts positioned on each side of the helmet in the temple area, each post having a central axis generally perpendicular to the helmet outer surface, including a first pair of closely spaced posts placed on the left side of the helmet and a corresponding pair of closely spaced posts on the right side of the helmet;

c. a grooved area formed around each post defining a narrowed diameter section of each post generally between its end portions;

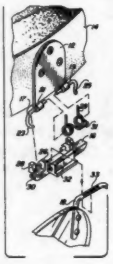
d. means carried by the face mask for forming a quick release connection of the face mask to the helmet at the posts which allows removal of the mask from the posts responsive to application of force to the mask, as during contact sports, from one or more directions including at least force which moves the mask end portion away from a post in a direction away from the helmet and generally along the central axis of the post and force applied in a direction which moves the mask in a direction away from the post in a direction along the helmet and at an angle to the post wherein the posts on each side of the helmet are positioned along a horizontal line.

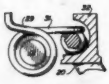
4,885,808

HEADBAND WITH MULTIPOSITIONED LENSPIECE

Brent Carpenter, Mesa, Ariz., assignor to Dan J. Goodard, Phoenix, Ariz.

Filed Sep. 6, 1988, Ser. No. 240,793
Int. Cl.[4] A61F *9/02*; G02C *9/02*
U.S. Cl. 2—452 **10 Claims**





1. A combination headband and multiposition lens piece which comprises:

(a) a headband for encircling the head of the wearer;

(b) a panel attached to said headband and including first and second laterally extending arms;

(c) first and second end segments each of which is affixed to a corresponding arm;

(d) a lens piece support member having a pair of spaced receiving sections for engagement with said end segments, said support member including a central outward extention for supporting a lens piece thereon;

(e) a lens piece comprising first and second individual lenses and a connecting member therebetween, said connecting member being provided with engaging surfaces thereon, said engaging surfaces defining the positions of said lens piece;

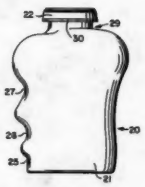
(f) rotation resisting means interposed between said panel and an engaging surface of the connecting member for contacting an engaging surface thereof and resisting rotation of the lens piece from the corresponding position.

4,885,809

PORTABLE POCKET SPITTOON

Charles H. Muchmore, P.O. Box 17245, St. Bernard, Ohio 45217

Continuation-in-part of Ser. No. 147,439, Jan. 25, 1988, abandoned. This application Apr. 14, 1989, Ser. No. 339,011
Int. Cl.[4] A61J *19/00*
U.S. Cl. 4—259 **3 Claims**



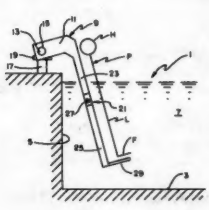
1. A handheld, portable, pocket sized spittoon comprising a container having two opposed side walls connected by two opposed end walls and opposed bottom and top walls, said top wall having an opening therein to provide a passageway for spitting, said spittoon being constructed of plastic and having a plastic cap hingedly connected thereto and snap-fitted onto said opening, one of the said two opposed side walls and one of the said end walls having four finger grip depressions therein, extending one above the other, the uppermost depression consisting of a depression to accommodate the end of an index finger while the remaining depressions allow the other fingers of one hand to wrap around the one said opposed end wall when the thumb is engaging the other of said side walls, the snap-cap having a tab thereon extending above the other of said opposed side walls such that when the user desires with the fingers in place as described above upward pressure may be applied on said tab by the thumb to disengage said cap from said opening while engagement of said depressions by the fingers holds said spittoon firmly.

4,885,810

ARTICULATED LITTER FOR HYDROTHERAPY

Gregory T. Unger, and Daniel D. Unger, both of P.O. Box A, New Berlinville, Pa. 19545

Continuation of Ser. No. 37,840, Apr. 13, 1987, abandoned. This application Apr. 17, 1989, Ser. No. 313,613
Int. Cl.[4] E04H *3/18*; A47K *3/12*
U.S. Cl. 4—496 **4 Claims**



1. An articulated litter adapted to aid a patient in entering or leaving a hydrotherapeutic pool comprising:

an upstanding pedestal mounted adjacent said pool and carrying a vertically disposed shaft mounted for rotation around its vertical axis;

a rotable head positioned at the upper end of the vertical shaft mounted for rotation around a horizontal axis;

a litter having a top side and a bottom side, said top side being generally planar to support a patient and having a head portion and a foot portion with the foot portion including a platform extending generally normal to said top side, said rotatable head being attached to the litter at said underside opposite the head portion in a generally normal orientation, said rotatable head being of such length that with said pedestal mounted on the edge of said pool and said litter positioned in a generally vertical orientation with the patient standing on the platform, said litter and patient will be located in said pool, said patient maybe moved out of said pool and held in a horizontal position overlying said pool edge by rotation of said rotatable head and said shaft.

4,885,811

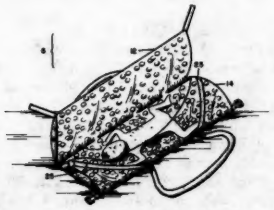
PROTECTING BODIES DURING TRANSIT

Michael L. Hayes, 4722 Donegal, Corpus Christi, Tex. 78411

Continuation-in-part of Ser. No. 910,682, Sep. 23, 1986, abandoned. This application May 23, 1988, Ser. No. 197,439

Int. Cl.[4] A61G *1/00*

U.S. Cl. 5—82 R **15 Claims**



1. A lightweight apparatus evacuable into a shapable soft cushiony support for protecting a body during transport, comprising

a flexible envelope having therein a fluid and a multiplicity of independently movable resilient fluid filled cells having a Shore A Durometer rating not greater than about 10; and

means for evacuating the fluid from the envelope.

4,885,812

COMBINATION BACKPACK AND COT

Charles E. Lindner, Scarborough, Canada, assignor to Ron Carriere, Gormley, Canada, a part interest

Filed Aug. 5, 1988, Ser. No. 229,470

Claims priority, application Canada, Jul. 8, 1988, 57508

Int. Cl.[4] A47C *29/00*

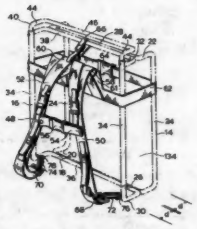
U.S. Cl. 5—113 **24 Claims**

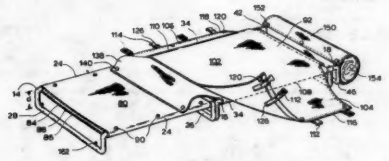
1. A combination cot and backpack structure having an open position to form an elevated cot and a closed position to form a backpack comprising:

(a) first and second rigid frame sections, each of which has first and second ends and a pair of parallel spaced side portions interconnected at the first and second ends respectively by first and second u-shaped cross portions which extend rigidly a predetermined distance downwardly in the open position,

(b) first and second sheets of flexible material mounted respectively on each of the first and second frame sections to extend tautly across between the side portions,

(c) connecting means to interconnect the first and second frame sections in both the open position in which the first end of the first frame section abuts the first end of the second frame section with the side portions of the first and second frame sections substantially aligned, and in the closed position in which the u-shaped cross portions extend inwardly to form a back pack enclosure between the first and second frame sections, and





(d) carrying harness attached to the structure in the closed position.

4,885,813

FOLDING HEADBOARD FOR FOLDING BED

George McNamara, Minneapolis, Minn., assignor to Sico Incorporated, Minneapolis, Minn.

Filed Feb. 24, 1988, Ser. No. 159,892

Int. Cl.[4] A47C *19/02*

U.S. Cl. 5—136 **5 Claims**

1. An automatic folding headboard for a folding bed which includes a fixed frame for mounting in a wall recess or cabinet and a moveable frame pivotally connected to said fixed frame for permitting movement of the bed from a horizontal use position in the room to a vertical storage position in the wall recess or cabinet, said headboard comprising:

first, second and third headboard members;

hinge means connecting adjacent edges of said first and second board members, and adjacent edges of said second and third board members;

means for securing the first board member to the moveable frame at the head of the bed;

motion control means for supporting said third board member with respect to the side walls of said wall recess or cabinet to form a three-part hinged headboard substantially covering the lower portion of said wall recess or cabinet in which said fixed frame and pivot are mounted, wherein said third headboard member forms a shelf when the bed is in its horizontal use position, and wherein said second and third headboard members fold into a substantially vertical position and said first headboard member

folds to a substantially horizontal position when said folding bed is folded into the vertical storage position; and

said motion control means configured for guiding and permitting controlled motion of the rear edge of said third board member as said bed is moved between horizontal and vertical positions so that the hinged board members can automatically move to a folded storage position as the bed is moved to its vertical storage position.

4,885,814

PROCESS FOR CONTINUOUS TREATMENT, PREFERABLY DYEING, OF TEXTILE MATERIAL IN ROPE FORM

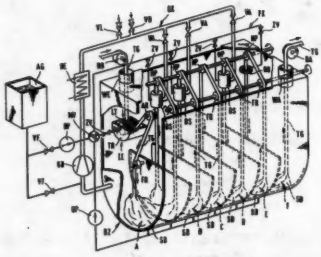
Hans-Ulrich von der Eltz, Frankfurt am Main, and Wilhelm Christ, Michelbach/Bilz, both of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Fed. Rep. of Germany

Filed Sep. 29, 1988, Ser. No. 250,924

Claims priority, application Fed. Rep. of Germany, Oct. 1, 1987, 3733219

Int. Cl.[4] D06B *3/28*

U.S. Cl. 8—149.1 **17 Claims**



1. A process for continuously treating textile material made of synthetic and/or natural fibers in continuous loop rope form with an aqueous liquor containing at least one treating agent on a jet dyeing machine having a self-contained treatment zone and a recirculating gas stream generated by actuation of a jet system, the kinetic energy of which provides the propulsive force for continuously transporting the textile material spirally through the self-contained treatment zone, comprising the steps of continuously introducing the textile material into the self-contained treatment zone through a sealing inlet thereof, impregnating the textile material with the aqueous liquor in the course of its passage through the treatment zone, conveying the textile material forward through the treatment zone by means of the circulating gas stream via an aerodynamically active jet arrangement comprising at least one transport jet, allowing the textile material to dwell under conditions capable of being effective for the treating agent towards the textile material in the treatment zone up to 20 minutes, and transporting the textile material out of the treatment zone through a sealing outlet thereof.

4,885,815

POWERED CLEANING TOOLS

Neville J. Smith, 6 Albemarle Terrace, London Road, Attleborough, Norfolk, England

Filed Aug. 9, 1988, Ser. No. 230,067

Claims priority, application United Kingdom, Sep. 18, 1987, 8721944

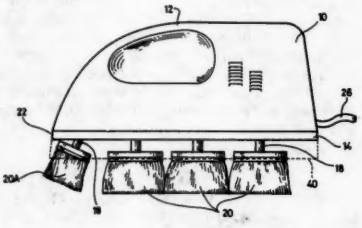
Int. Cl.[4] A46B *13/02*

U.S. Cl. 15—28 **8 Claims**

1. A powered tool for cleaning windows which comprises:

a tool body having an underside and an upperside where at said tool body is adapted to be held by a hand of a user, said tool body being elongate in a front to back direction and being tapered to a substantially pointed leading end at the front;

a plurality of cleaning elements projecting from said tool body on the underside thereof, including an inclined cleaning element which projects downwardly and forwardly in front of the leading end of said tool body; and,



means within said tool body for driving said plurality of cleaning elements, said cleaning elements each being driven in rotation substantially without displacement relative to said tool body.

4,885,816

ROTATING-BRUSH WASHING APPARATUS

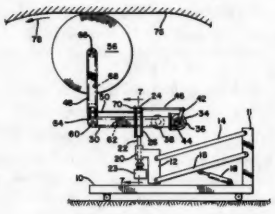
Masayuki Hashimoto; Manabu Sakamoto; Taizo Tsutsui; Satoshi Satoh; Yukihiko Kouza; Keikichi Murakami, all of Kobe; Tonokatsu Soga; Akira Takeishi, both of Yokohama; Teruhiko Takusagawa, Chiba, and Misao Hayashi, Tokyo, all of Japan, assignors to Kawasaki Jukogyo Kabushiki and Japan Air Lines Co., Ltd., both of Tokyo, Japan

Filed Aug. 4, 1988, Ser. No. 228,535

Claims priority, application Japan, Aug. 4, 1987, 62-195110; Aug. 4, 1987, 62-119696[U]

Int. Cl.[4] B64F *5/00*; B60S *3/06*

U.S. Cl. 15—53 A **8 Claims**



1. Washing apparatus comprising:

a carriage,

a support and means for mounting said support on said carriage for movement up and down,

an outer ring fastened to said support so that the axis of said outer ring extends substantially horizontally, and means connected to said outer ring and said support so that said ring is rotatable around a substantially vertical axis extending radially of said ring,

an inner ring supported coaxially by said outer ring and rotatable relative to said outer ring,

a swing arm extending through and supported by said inner ring for swinging movement on a swing axis,

a frame supported pivotably on said swing arm adjacent one end of said swing arm,

a roll-shaped brush supported rotatably by said frame so that the axis of said brush extends substantially in parallel with said swing axis,

drive means and swing enabling means mounted on said swing arm adjacent the other end of said swing arm, said drive means being connected in driving relation with said brush,

said swing enabling means including a shaft in parallel with said swing axis, said shaft being adapted to be rotated in one direction,

a lever fixed to said shaft,

a first link interconnecting one end of said lever and said inner ring so as to form a four-section link mechanism, which forces said arm to turn around said swing axis when said shaft rotates, and

a second link interconnecting said inner ring and said frame so as to form another four-section link mechanism, which holds said frame in a substantially vertical plane.

4,885,817

AIR-DUST SEPARATION SYSTEM FOR A PNEUMATIC ROAD-CLEANING VEHICLE

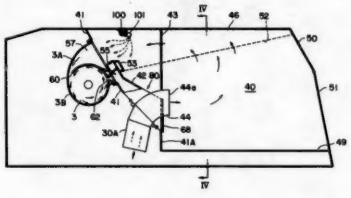
Kozo Tanase, Hozumi, Japan, assignor to Howa Machinery, Ltd., Aichi, Japan

Filed Sep. 4, 1987, Ser. No. 93,005

Claims priority, application Japan, Sep. 9, 1986, 61-211866

Int. Cl.[4] E01H *1/08*

U.S. Cl. 15—340.1 **7 Claims**



1. A pneumatic road-cleaning vehicle comprising:

(a) vehicular chassis means;

(b) means on the chassis means defining an air-dust separation chamber having a substantially cylindrical shape, the air-dust separation chamber having an intake opening and a discharge opening, both extending longitudinally thereof, a closed end and an open end;

(c) blower means disposed opposite the open end of the air-dust separation chamber for producing a current of air under pressure by drawing air from the air-dust separation chamber and for creating a partial vacuum in the air-dust separation chamber;

(d) a pickup head communicating with the blower means for directing the current air against a road surface to be cleaned to collect rubbish therefrom;

(e) a rubbish hopper communicating with the pick-up head for accommodating the collected rubbish carried therefrom by the current of air;

(f) the air-dust separation chamber communicating via the intake opening thereof with the rubbish hopper for receiving the current of air laden with at least any dust included in the collected rubbish;

(g) baffle means communicating with the rubbish hopper and the air-dust separation chamber for regulating the flow of the air from the rubbish hopper into the air-dust separation chamber to cause the air within the chamber to spiral so as to effect centrifugal separation of any dust from the air;

(h) a dust collection vessel having an open first end in communication with the discharge opening of the air-dust separation chamber and subject to the partial vacuum created in the air-dust separation chamber by said blower means for receiving the separated dust therefrom, and a second end open to the rubbish hopper, the dust collection vessel generally sloping downwardly as it extends from the first to the second end thereof for causing any dust received in the vessel to travel under gravity from the first to the second end thereof; and

(i) a door hingedly attached to the dust collection vessel for openably closing the second end thereof, the second end of the dust collection vessel being closed by the door during the operation of the blower means due to the exertion of the partial vacuum created in the air-dust separation chamber by the blower means on the door until the weight of the dust received in the dust collection vessel is sufficient to overcome the suction exerted on the door.

4,885,818

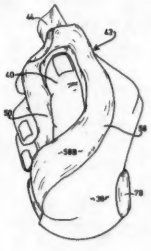
ERGONOMIC KNIFE AND KNIFE HANDLE

Travis W. Arterbury, 1700 W. Fourth St., Russellville, Ark. 72801

Filed Jul. 15, 1988, Ser. No. 219,307

Int. Cl.[4] B25G *1/10*

U.S. Cl. 16—110 R **14 Claims**



8. An ergonomically efficient knife comprising:

a rigid arcuate rib adapted to be firmly grasped by the hand and fingers of a user, said rib extending between an anterior end and a spaced-apart posterior end; and,

a blade extending forwardly from said rib anterior end;

an arch for aiding in the manipulation of said knife, said arch extending approximately from said rib anterior end at one side of the said rib to an opposite side of said rib at said posterior end, said arch having an inner surface generally conforming to the natural curve of the user's hand, and said arch defining an orifice between itself and said rib penetrated by the user's thumb and a portion of the user's palm.

4,885,819

MEMBER FOR CONTROLLING A TAP OR A FAUCET

Jean C. Delepine, 23 rue Clapeyron, 75008 Paris, France

Continuation of Ser. No. 27,108, Mar. 13, 1987, abandoned, which is a continuation of Ser. No. 746,299, Jun. 19, 1985, abandoned. This application Jun. 30, 1988, Ser. No. 214,886

Claims priority, application France, Oct. 15, 1984, 84 15774; Jan. 3, 1985, 85 00042

Int. Cl.[4] A47B *95/02*

U.S. Cl. 16—121 **20 Claims**

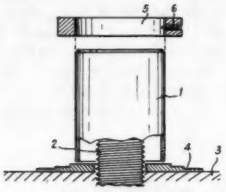
1. A handle apparatus for a tap comprising:

a cylindrical skirt;

at least one annular piece able to freely slide along said cylindrical skirt, wherein said annular piece is shorter than said cylindrical skirt, whereby when said annular piece is in a median position on said skirt the cylindrical skirt is visible above and below said annular piece; and

fixation means supported by said annular piece for fixing said

annular piece at any position along said cylindrical skirt, wherein the height of said handle remains constant when



said annular piece is moved relative to said cylindrical skirt.

4,885,820

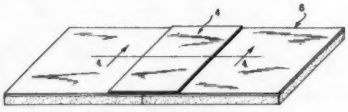
PLASTIC HINGE, HINGED MATERIAL, AND METHOD FOR HINGING

Jack P. Erceg, Marstons Mills, Mass., and Tzong I. Yeh, Fremont, Calif., assignors to Packaging Industries Group, Inc., Hyannis, Mass.

Filed Nov. 30, 1987, Ser. No. 114,983

Int. Cl.[4] E05D *1/00*; B29C *65/00*

U.S. Cl. 16—225 **17 Claims**



1. A hinge for joining surfaces of sheet material comprising:

foam means for only partially or substantially collapsing during heat sealing providing an inner hinge surface for heat sealing to the surfaces of the sheet material to be hinged, and

sheet means for providing an outer hinge surface,

wherein said foam means and said sheet means comprise outer layers of laminated sheet material forming said hinge.

4,885,821

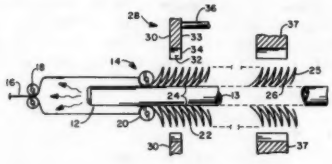
METHOD AND APPARATUS FOR SEVERING SHIRRED TUBULAR FOOD CASING AND ARTICLE

John Farkonas, Glenview, Ill., assignor to Viskase Corporation, Chicago, Ill.

Filed Aug. 1, 1988, Ser. No. 226,635

Int. Cl.[4] A22C *13/02*

U.S. Cl. 17—49 **30 Claims**



1. In a shirring method including longitudinally moving a tubular food casing in a shirring direction over a mandrel and into a shirring zone, shirring the tubular casing in the shirring zone to form a shirred stick composed of generally conical pleats nested one within another with the innerfold of each pleat being formed against the mandrel, and then stopping the shirring when a desired length of shirred stick has accumulated on the mandrel, the improvement comprising;

(a) longitudinally separating the shirring zone and shirred stick to provide a space therebetween and expose a section of unshirred tubular casing which extends from the shirring zone and merges into the shirred conical pleats defining the end face of the stick at the last-shirred end thereof;

(b) positioning an arcuate tear edge about the conical pleats at said end face;

(c) holding the unshirred tubular casing against longitudinal movement in the shirring direction;

(d) driving the tear edge longitudinally in the shirring direction and against said end face while continuing said holding step (c) to move the stick longitudinally along the mandrel relative to the shirring zone and away from the exposed section of unshirred tubular casing; and

(e) continuing said holding step (c) and driving step (d) thereby first tensioning the exposed section of tubular casing and thereafter transversely tearing it from the stick along said tear edge at said end face.

4,885,822

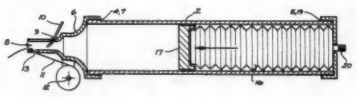
FOOD COMPRESSOR

Narelle G. Corrie, and Robert J. R. Read, both of Guildford, Australia, assignors to Steaka-Maka Marketing Pty Limited, Guildford, Australia

Filed Oct. 23, 1987, Ser. No. 111,541

Int. Cl.[4] A22C *11/06*

U.S. Cl. 17—39 **9 Claims**



1. In a food compressor comprising means defining an elongate open ended chamber, a shaping device releasably secured to one end of said chamber, said shaping device having an opening of predetermined shape allowing food to be extruded therethrough, and an air-operated drive ram located within and at the other end of said chamber and movable towards said shaping device, the improvement comprising said compressor being portable and constructed to be free-standing on a supporting surface, an end cap releasably secured to the other end of said chamber, the drive ram including a drive cap and a concertina bellows, one end of said bellows engaging and pushing said drive cap and the other end of said bellows being attached to said end cap, and a valved tube connected to said other end of said bellows and extending through said end cap, the other end of said tube being connectable to an air pump to controllably introduce air under pressure into said bellows.

4,885,823

METHOD AND APPARATUS FOR ORIENTING FIBRES

Ernst B. Voellm, Horgen, Switzerland, assignor to Siegfried Payer, AG, Wollerau, Switzerland

Filed May 9, 1988, Ser. No. 192,234

Claims priority, application Switzerland, May 12, 1987, 1825/87

Int. Cl.[4] D01G *25/00*

U.S. Cl. 19—296 **29 Claims**

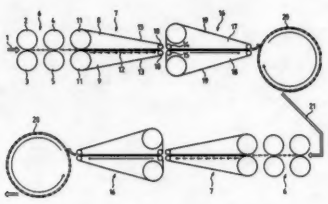
1. A method for processing fibres present in a disordered arrangement in a textile raw material comprising the steps of:

advancing strips of said textile raw material having fibres in a disordered and tangled arrangement;

zonally contacting and connecting said material during said advance to successively draw therefrom fibre tufts for parallelizing the fibres; and

providing doubling means receiving said successively drawn

fibre tufts and upon receiving newly arrived fibre tufts, placing the tufts in superimposed position and forming



from the fibre tufts a compact continuous web having parallelized and disentangled fibre tufts on one side thereof.

4,885,824

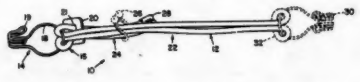
ADJUSTABLE TENSION FASTENER

Leonard M. Schwab, 3 Olde Lantern Rd., Acton, Mass. 01720, and Steven Caney, Centre Harbor, N.H., assignors to Leonard M. Schwab, Acton, Mass.

Filed Sep. 2, 1988, Ser. No. 239,641

Int. Cl.[4] F16L *33/00*

U.S. Cl. 24—17 B **10 Claims**



1. A slip-proof adjustable tension fastener comprising:

a rigid loop-hook having a rigid loop member and a rigid hook member;

a flexible elastic cord connected to said rigid loop member by a pull-through know for defining a stretchable tension portion and a slack reserve portion of said cord; and

a retainer member having a hole for receiving said reserve portion, said hole sized to allow said elastic cord to slip through in a stretched state and friction fit said cord to tightly hold said cord in a relaxed state;

said retainer member on said reserve portion proximate said pull-through knot for allowing adjustment of the length of said tension portion and preventing said knot from slipping when said tension portion is stretched.

4,885,825

BUCKLE APPARATUS

Yasuho Kitazawa, and Kazuyoshi Ishiguro, both of Aichi, Japan, assignors to Kabushiki Kaisha Tikai-Rika-Denki-Seisakusho, Ohaza-Toyota, Japan

Filed Jun. 17, 1988, Ser. No. 208,133

Claims priority, application Japan, Jun. 18, 1987, 62-093838[U]

Int. Cl.[4] A44B *11/26*

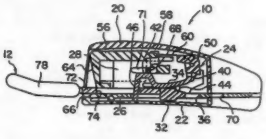
U.S. Cl. 24—639 **7 Claims**

1. A buckle apparatus for use in a plurality of seat belt assemblies each having a tongue plate with an identical inserting portion and an identical through hole and a buckle and disposed adjacent to each other, each said buckle being provided with a lock member having an identical shape and being engageable with said through hole of said tongue plate as said tongue plate is inserted into said buckle, said buckle apparatus comprising:

a first buckle having a first portion for forming an opening of a tongue plate-inserting passage and having a large width and a second portion having a width which becomes gradually smaller in the vicinity of said opening in the direction of a forward end of said buckle, as viewed in the direction of a forward end of said buckle, as viewed in the direction of insertion of said tongue plate;

a second buckle having a third portion having a width which becomes smaller from an opening of said tongue plate-inserting passage to a predetermined position in the direction of insertion of said tongue plate and a fourth portion which is formed continuously from said third portion in the direction of insertion of said tongue plate and whose width is made abruptly smaller than that of said third portion;

a first tongue plate which can be inserted into said first buckle up to a position for engagement with said lock



member, but which cannot be inserted into said second buckle up to said position for engagement with said lock member, the width of a portion thereof corresponding to said first portion of said first buckle being made greater than that of said third portion of said second buckle; and

a second tongue plate which can be inserted into said second buckle up to a position for engagement with said lock member, but which cannot be inserted into said first buckle up said position for engagement with said lock member, the width of a portion thereof corresponding to said third portion of said second buckle being made abruptly larger than that of said second portion of said first buckle.

4,885,826

EXTERNALLY HELD EXPANDER FOR TUBULAR TEXTILE FABRIC

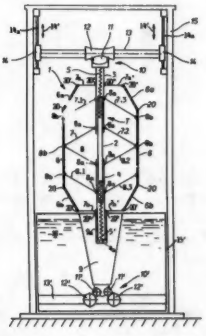
Werner Strudel, Friedrichshafen, Fed. Rep. of Germany, assignor to Lindauer Dornier Gesellschaft mbH, Lindau, Fed. Rep. of Germany

Filed Sep. 29, 1988, Ser. No. 251,501

Claims priority, application Fed. Rep. of Germany, Sep. 29, 1987, 3732754

Int. Cl.[4] D06C *3/00*

U.S. Cl. 26—80 **20 Claims**



1. An externally held expander for tubular textile fabric comprising machine frame means, central carrier means having

a central longitudinal axis for supporting said expander, said central carrier means including a first carrier section and a second carrier section, means for telescoping said first and second carrier sections relative to each other in the direction of said central longitudinal axis, substantially longitudinally extending guide rods, first strut means for securing said guide rods to said first carrier section, second strut means for securing said guide rods to said second carrier section, first pivot means securing a radially inner end of said first strut means to said first carrier section and a radially outer end of said first strut means to a respective guide rod of said guide rods, second pivot means for securing a radially inner end of said second strut means to said second carrier section and a radially outer end of said second strut means to a respective guide rod of said guide rods, said first strut means being inclined in one direction, said second strut means being inclined in a direction opposite to said one direction, axially effective spring means (5) arranged for cooperation with said first and second carrier section to urge said first and second carrier sections axially away from each other, support roller means at least at one axially outer end of said first and second carrier sections for supporting said central carrier means, position determining roller means mounted in said frame means for cooperation with said support roller means to determine an axial spacing between said first and second carrier sections, said position determining roller means comprising at least one set of rollers that is adjustable in its axial position, and position adjustable mounting means on which said positioning rollers mounted for an axial position adjustment against the force of said spring means in one axial direction and with said spring force opposite axial direction, whereby an axial movement of said rollers permits an adjustment of an effective diameter of said expander by varying said axial spacing between said first and second carrier sections.

4,885,827

ELASTIC MEMBRANE SEAT WITH FLUIDIC BLADDER TENSIONING METHOD

Jerry K. Williams, Sterling Hts., Mich., assignor to General Motors Corporation, Detroit, Mich.

Division of Ser. No. 116,575, Nov. 4, 1987, Pat. No. 4,796,955. This application Sep. 16, 1988, Ser. No. 245,238

Int. Cl.[4] B68G 7/00

U.S. Cl. 29—91.1 **1 Claim**

1. A method of varying the frequency response of a vehicle seat with spaced frame members, said method in combination comprising:

elastically spanning said spaced frame members with a membrane having at least one side portion partially wrapped around at least one of said frame members to provide a support surface for said seat;

connecting to said membrane and to at least one of said frame members a selectively inflatable fluid bladder contacting said membrane beyond said support surface;

selectively inflating said fluid bladder whereby the tension of said membrane is varied.

4,885,828

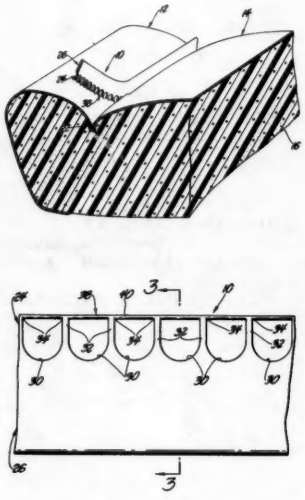
METHOD AND APPARATUS FOR POSITIONING FABRIC COVERS ON A FOAM CUSHION

Eric F. Kozlowski, Rochester, Mich., assignor to Lear Siegler Seating Corp., Southfield, Mich.

Filed Nov. 14, 1988, Ser. No. 270,100

Int. Cl.[4] B68G 7/00, 7/12

U.S. Cl. 29—91.5 **12 Claims**



1. A method of covering a cushion member (16) with fabric (12, 14) comprising the steps of: forming an elongate slot (22) in a cushion member (16); positioning a locator strip (10) between the edges (18, 20) of two pieces of fabric cover (12, 14); fastening the edges (18, 20) of the two covers (12, 14) to the locator strip (10) in a plurality of spaced discrete fastened locations at least partially surrounded with a portion of the locator strip (10) adjacent the edges (18, 20) with void unfastened segments extending between adjacent fastened locations; inserting the locator strip (10) and the edges (18, 20) of the two covers (12, 14) into t he slot (22) in the cushion member (16); and characterized by pulling the entire portion of the locator strip (10) surrounding the fastened locations through the void unfastened segments therebetween whereby the entire locator strip (10) is removed from the two covers (12, 14) and the cushion member (16).

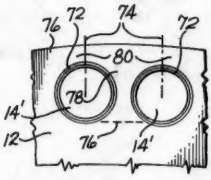
7. A removable positioning strip assembly (10) for upholstering a foam cushion member (16) with two fabric covers (12, 14), each of the covers (12, 14) having edges (18, 20) adapted to be sewn together and received into an elongated slot (22) in the cushion member (16), comprising: insert means (24) adapted to be secured between the edges (18, 20) of the two covers (12, 14) for positioning the edges (18, 20) of the two covers (12, 14) into the slot (22) in the cushion member (16); extension means (26) extending outwardly from said insert means (24) for receiving a pulling force in a direction away from said insert means (24); and characterized by said insert means (24) including detachment means (38) for allowing said insert means (24) to unitarily detach from the two covers (12, 14) in response to a pulling force applied to said extension means (26) whereby said strip assembly (10) is entirely removed in one piece from the two covers (12, 14) and the cushion member (16).

4,885,829

FATIGUE LIFE ENHANCEMENT OF DOVETAIL CONNECTOR SLOTS AND NONCIRCULAR OPENINGS

Michael A. Landy, Bellevue, Wash., assignor to Fatigue Technology, Incorporated, Seattle, Wash.

Filed Feb. 16, 1989, Ser. No. 312,593
Int. Cl.[4] B21K *3/04;* B23P *15/02, 13/04*
U.S. Cl. 29—156.8 R 12 Claims



1. A method of forming a fatigue life enhanced dovetail connector slot in a workpiece, comprising:
drilling a pair of spaced-apart openings in the workpiece at locations spaced about equal distances inwardly from an edge of the workpiece;
cold-expanding the workpiece material immediately surrounding each opening by passing a cold-expansion mandrel through each opening;
cutting the workpiece along lines extending inwardly from the edge to central regions of the cold-expanded openings;
removing the region of the workpiece material between the two openings and the two cuts; and
machining edge portions of the material in the vicinity of the cuts and the openings to a final desired size and shape but retaining the cold-expanded round regions bounding the slots.

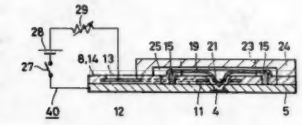
10. A method of forming a noncircular opening in a workpiece which is immediately bounded by material which includes residual compressive stresses for fatigue life enhancement, said method comprising:
drilling a plurality of at least two spaced-apart openings in the workpiece;
cold-expanding the workpiece material immediately surrounding each opening by passing a cold-expansion mandrel through each opening;
cutting the workpiece along lines intersecting the openings and removing a region of the workpiece material which is between the openings; and
leaving circular portions of the cold-expanded drilled openings so that the noncircular opening which results is partially bounded by the circular region.

4,885,830

PROCESS OF PRODUCING A VALVE ELEMENT

Yoshimitsu Ohtaka, Shizuoka, Japan, assignor to Tokyo Electric Co., Ltd., Tokyo, Japan

Division of Ser. No. 146,782, Jan. 21, 1988, Pat. No. 4,821,999.
This application Feb. 17, 1989, Ser. No. 311,835
Claims priority, application Japan, Jan. 22, 1987, 62-13066; Mar. 13, 1987, 62-58507
Int. Cl.[4] B21D *53/00*
U.S. Cl. 29—157 C 9 Claims



1. A process of producing a valve element, comprising:
a nozzle pattern forming step of forming a photo-resist layer corresponding to a nozzle on a surface of a substrate;
a nozzle plate forming step of forming a metal film on the surface of said substrate and removing said photo-resist layer to form a nozzle plate having a nozzle therein;
a first insulator layer forming step of forming a first insulator layer on a surface of said nozzle plate such that openings may be formed at a location opposed to said nozzle and other predetermined locations;
an electrode pattern forming step of forming a photo-resist layer on a surface of said first insulator layer around a location opposed to said nozzle;
an electrode plate forming step of forming a metal film on a surface of said first insulator layer and removing said photo-resist layer to form an electrode plate;
a second insulator layer forming step of forming on the surface of said first insulator layer a second insulator layer which covers said electrode plate such that openings may be formed in an opposing relationship to said openings of said first insulator layer;
a spacer forming step of forming a spacer of a material different from a material of said nozzle plate on a surface of said second insulator layer including a location opposed to said nozzle and an area around the location;
a valve beam pattern forming step of forming a photo-resist layer on a surface of said spacer except a location opposed to said nozzle and a location opposed to a peripheral portion of said spacer;
a valve beam forming step of forming a metal film on the surface of said spacer to form a valve beam which is contiguous at an end portion thereof to said nozzle plate via one of said openings and which has a valve at a yieldable portion thereof and then removing said photo-resist; and
a separating step of removing a central portion of said spacer including a portion opposed to said nozzle and then exfoliating said substrate from said nozzle plate.

4,885,831

METHOD FOR FORMING A CONTOUR HARDENED GEAR

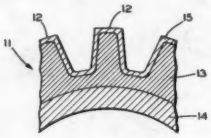
Gregory A. Fett, Ft. Wayne, Ind., assignor to Dana Corporation, Toledo, Ohio

Filed Sep. 26, 1988, Ser. No. 249,382
Int. Cl.[4] B21K *53/28;* C21D *1/06*
U.S. Cl. 29—159.2 10 Claims

1. A method for forming a contour hardened gear comprising the steps of:
(a) providing a gear blank;
(b) softening the gear blank by a heat treatment process to provide a relatively soft level of hardness throughout;

(c) machining the softened gear blank so as to form a plurality of teeth about the circumference thereof;

(d) prehardening the machined gear blank such that surfaces of the teeth and an outer region of a core of the gear are hardened to an intermediate level of hardness while an inner region of the core remains at the relatively soft level of hardness; and



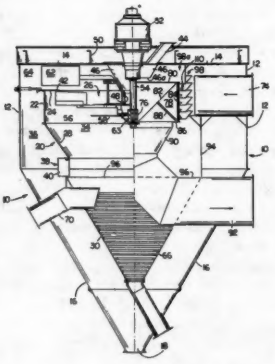
(e) contour hardening the prehardened gear such that the surfaces of the gear teeth are further significantly hardened, while the outer region of the core of the gear remains at the intermediate level of hardness and the inner region of the core remains at the relatively soft level of hardness.

4,885,832

METHOD OF MAKING A RETROFIT SIDE DRAFT CLASSIFIER

William S. English, Hingham, Mass., assignor to Sturtevant, Inc., Boston, Mass.

Filed Jul. 7, 1988, Ser. No. 216,085
Int. Cl.[4] B21K *21/16*
U.S. Cl. 29—401.1 **8 Claims**



1. A method of making a side draft particle classifier comprising the steps of:

locating an already installed updraft whirlwind separator including an outer casing having an outside upper drum and a lower fines cone and a coaxial inner casing comprising an inside upper drum spaced vertically from an inner tailings cone by an air inlet ring and having a rotor assembly comprising a lower distribution plate and an upper main fan blade assembly attached to a coaxial rotor shaft suspended from a bearing housing mounted on the head of the outer casing surrounded by a coaxial feed cone connected to a feed chute for delivering raw material to the lower distribution plate whereby the material is flung outwardly by centrifugal force into an upward air stream which takes the fine particles up over the inside drum and into the space between the inner and outer casings, the coarse material falling into the tailings cone,

removing the rotor assembly from the shaft,

removing the inside drum,

shortening the existing coaxial feed cone,

mounting a side draft classifier rejector cage on the existing rotor shaft for rotation therewith, said rejector cage having an upper distribution plate beneath the shortened feed cone,

installing a stationary fines chamber beneath the rejector cage with an outlet duct for the fines chamber extending through an opening in the existing outer casing,

mounting a side draft air inlet system around the newly added rejector cage for creating a radial inward draft through the wall of the existing outer casing,

sealing the space below the newly added air inlet system to the top of the tailings cone, and

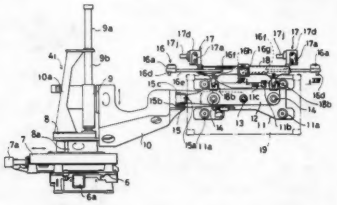
mounting a cylindrical screening element between the newly added side draft air inlet and rejector cage to define the new separation zone.

4,885,833

APPARATUS AND METHOD FOR MOUNTING WINDOW GLASSES ON AUTOMOBILE

Shigehiro Umegai; Teruhisa Noguchi; Hirobumi Morita; Takashi Uehara, and Takayuki Hoshino, all of Sayama, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 5, 1988, Ser. No. 253,451
Int. Cl.[4] B23Q *17/00*
U.S. Cl. 29—407 **6 Claims**



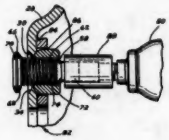
1. An apparatus for mounting window glasses on an automobile in which a jig for holding the window glass is supported on a support frame in such a manner that the jig can be advanced and retreated as desired, said support frame being mounted on a robot, and the robot is operated to position the support frame at a location facing a window portion of a car body on a car body conveying line and, in this condition, move the jig forward to the window portion for mounting the window glass therein, characterized in that the robot comprises a robot arm swingable from a position outside the car body conveying line to said line and movable in the directions of the length, width and height of the car body with the car-width direction being taken as an X-axis direction, the direction in which the upper and the lower frames of the window portion face each other being taken as a Y-axis direction and the direction perpendicular to both the X-axis and Y-axis directions being taken as a Z-axis direction; the robot arm including a tilting shaft having an axis extending in the Z-axis direction when the robot arm is turned toward the conveying line, the support frame being tiltably mounted on the tilting shaft; a first detector is provided on the support frame for detecting a deviation in the X-axis direction of the jig with respect to the window portion; and a pair of second detectors are provided on the support frame for detecting deviations in the Y-axis direction of the jig with respect to the window portion, the detection being carried out at two locations which are symmetrical with respect to the X-axis direction center line of the jig.

4,885,834

METHOD AND DEVICE FOR REMOVING WHEEL NUTS AND CAP NUTS FROM THE OUTER WHEEL OF A DUAL-WHEEL DOUBLE-NUT SYSTEM

Paul J. Beerman, 301 S. Second St., Atwater, Minn. 56205

Filed Oct. 4, 1988, Ser. No. 253,035
Int. Cl.[4] B23P *19/00*; B25B *9/00*; B60B *11/00*
U.S. Cl. 29—426.5 5 Claims



1. A method of removing cap nuts from the outer wheel after the outer wheel has been removed from the inner wheel of a tractor or trailer comprising the steps of placing a flat annular ring having a plurality of hexagonal openings therein shaped so as to simultaneously receive therein whatever hexagonal wheel nuts remain threadedly engaged with their cap nuts, the ring having inner and outer circular edges and the number of said hexagonal openings corresponding to the total number of wheel nuts on said outer wheel with said hexagonal openings complementing said hexagonal wheel nuts and being disposed between said inner and outer edges and being equally spaced from each other throughout said annular ring, and then individually spinning each such cap nut out through the back side of said outer wheel while said remaining wheel nuts are prevented from rotating by reason of being received in certain of said hexagonal openings in said ring.

3. In combination, a wheel having a plurality of holes therein, flanged cap nuts residing in at least some of said holes, wheel nuts threadedly attached to said cap nuts, and a flat annular ring of uniform thickness throughout having a number of equally spaced holes therein hexagonally shaped and angularly oriented to simultaneously receive all of said wheel nuts therein when angularly oriented to correspond to the angular orientation of said hexagonally shaped holes to prevent rotation of as many of said wheel nuts that remain engaged with said cap nuts when said cap nuts are spun relative to said remaining wheel nuts to enable each such cap nut to be disengaged from the wheel nut with which it has remained engaged and to pass out through the back side of said wheel.

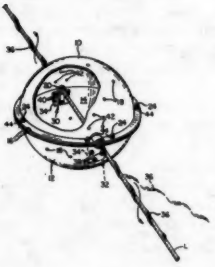
5. A device for facilitating the removal of ten wheel nuts from ten cap nuts each having a flange thereon wherein the ten wheel nuts are threadedly engaged with said ten cap nuts with said wheel nuts residing on one side of the wheel and the flanges of said cap nuts residing on the other side of said wheel, the device consisting of a flat annular ring of uniform thickness throughout having ten angularly and equally spaced hexagonal holes formed therein which are located completely around said annular ring, said holes being capable of simultaneously receiving all ten of said wheel nuts therein, said annular ring having an inner circular edge and an outer circular adge, said ten holes being located generally midway between said inner and outer circular edges, and said ring having a uniform thickness throughout.

4,885,835

METHOD OF ASSEMBLING LINE MARKER INTO SUSPENDED POWER LINE

George M. Osgood, 5539 SW. Westdale St., Portland, Oreg. 97221

Filed Feb. 2, 1989, Ser. No. 305,790
Int. Cl.[4] B21D *39/03*; B23P *19/04*
U.S. Cl. 29—463 2 Claims



1. In the positioning of a line marker on a power line, the method comprising:

providing a pair of substantially identical hemispherical shells where a face of each shell is formed by a flange extending in a plane which bounds an open end of each shell and each shell has arcuately bottomed recesses in diametrically opposite portions of the flange which forms the face of each shell,

securing a wire anchoring assembly to at least one shell by securing an end of the assembly to the interior of the shell with the remainder of the assembly extending through an arcuately bottomed recess and thence projecting through the exterior of the shell,

positioning the two shells with the shells opposite each other with their said flanges facing each other and with the arcuately bottomed recesses of one shell aligned with the arcuately bottomed recesses of the other shell, thereby providing a channel extending between the shells,

securing the two shells together through their said flanges at a region located laterally to one side only of said channel,

with the line suspended in the air and in a station located in the air separating the faces of the shells in a region disposed opposite the first-mentioned region through flexing of the shells and passing the shells over the line to position such line within said channel, and

with the line so positioned, securing the wire anchoring assembly to the line and securing the shell together with fasteners in said opposite region.

4,885,836

RIVETING PROCESS AND APPARATUS

Giovanni B. Bonomi; Luigi Giacomini, both of Mt. Prospect; Christiano Bonomi; Carmine Aresa, both of Des Plaines, and Valerio Frigo, Des Plaines, all of Ill., assignors to IMTA, Rockford, Ill.

Filed Apr. 19, 1988, Ser. No. 183,697
Int. Cl.[4] B21J *15/02*, *15/10*
U.S. Cl. 29—524.1 17 Claims

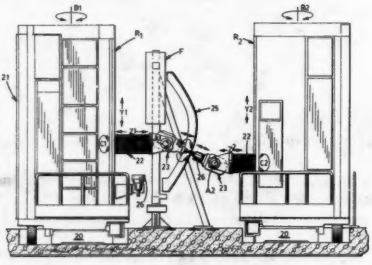
1. A method of riveting assembly components by means of computer controlled mobile machine tool centers or robots comprising the steps of:

(a) holding the assembly components to be riveted in predetermined fixed positions of interfacial engagement;

(b) mounting hole-forming tools and work-engageable end effector means on the tool head of a first robot;

(c) mounting work-engageable end effector means on the tool head of a second robot;

(d) positioning said first and second robots on opposite sides of the held components and in coaxial alignment with a pre-determined hole location thereon;
(e) actuating said end effector means on said first and second robots to engage and tightly clamp said components therebetween;
(f) controlling the clamping forces applied to said components to avoid stress and unbalanced thrust forces thereon;
(g) actuating said hole-forming tools to form a rivet hole through said components at said hole location;
(h) unclamping said end effectors and positioning said robots in coaxial alignment with another hole location; and performing steps (d) through (g) thereat and repeating this step until all the rivet holes are formed through said components;
(i) replacing the end effector means and hole-forming tools on the heads of said robots with end effector means com-



prising rivet setting tools, work-engageable means and means for feeding rivets to the rivet setting tools;
(j) repositioning said robots on opposite sides of said components and in coaxial alignment with a previously formed rivet hole;
(k) actuating said robots and end effector means to clamp said components tightly therebetween with regulated clamping force to avoid stress and unbalanced thrust forces thereon;
(l) actuating said rivet feed means to position a rivet for insertion into said previously formed rivet hole;
(m) actuating said rivet setting tools to insert and upset said rivet in said previously formed rivet hole; and
(n) unclamping said end effector means and successively repositioning said robots in coaxial alignment with each of the previously formed rivet holes and repeating steps (k) through (n) thereat until a rivet is installed in each of the previously formed holes.

4,885,837

APPARATUS FOR FORMING LEADS OF SEMICONDUCTOR DEVICES

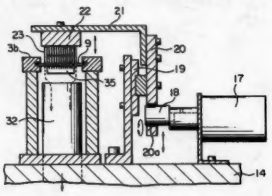
Taizo Eshima; Kunihiro Yasutake, and Katuhiko Yamasaki, all of Fukuoka, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Japan

Filed Dec. 15, 1988, Ser. No. 284,724
Claims priority, application Japan, Jan. 13, 1988, 63-6105; Jun. 20, 1988, 63-153093
Int. Cl.[4] B23P *23/00*
U.S. Cl. 29—564 **14 Claims**

1. An apparatus for forming the leads of resin-sealed semiconductor devices comprising:

tie-bar cutting means comprising a first press for cutting tie-bars connecting adjacent leads of a lead frame on which semiconductor chips are mounted and which has unwanted resin burrs as a result of resin-sealing of the semi-conductor chips;

resin-burr removing means for removing the resin burrs from the lead frame whose tie-bars have been cut by said tie-bar cutting means, said resin-burr removing means comprising a brush and moving means for moving said brush relative to said lead frame to brush the resin burrs from the lead frame; and



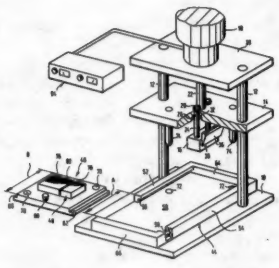
bending means comprising a second press for bending the leads of the lead frame whose resin burrs have been removed by means of said resin-burr removing means.

4,885,838

APPARATUS FOR CONNECTING THE FREE CONDUCTOR ENDS OF A CONDUCTOR BUNDLE

Christoph Ruecker, Bueren, and Wolfgang Thorwesten, Geseke, both of Fed. Rep. of Germany, assignors to Nixdorf Computer AG, Paderborn, Fed. Rep. of Germany

Filed Nov. 3, 1988, Ser. No. 266,911
Claims priority, application Fed. Rep. of Germany, Nov. 12, 1987, 3738498; Aug. 5, 1988, 3826741
Int. Cl.[4] B23P *19/04*; H01R *43/04*
U.S. Cl. 29—566.3 **13 Claims**



1. An apparatus for connecting the free conductor ends of a conductor bundle through the temperature assisted pressing onto the conductor ends of a material strip adherable or weldable to the plastic jackets of the conductor ends which are arranged parallel to one another, including a base plate, a conductor support removably held on the base plate and a pressing mechanism with a carrier plate for a pressing stamp which carrier plate is movable perpendicularly to the base plate, characterized in that the pressing stamp (16) is movably supported on the carrier plate (14) for movement parallel to the pressing direction against spring force, and that a cutting device is arranged on the carrier plate, for cutting off the conductor ends which extend outwardly beyond the material strip and said pressing stamp.

4,885,839

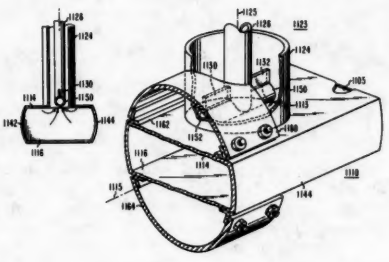
PROCESS OF FABRICATING A WAVEGUIDE

Oded Ben-Dov, Burlington County, N.J., assignor to General Signal Corporation, Stamford, Conn.

Division of Ser. No. 799,857, Nov. 20, 1985, abandoned, which is a continuation-in-part of Ser. No. 739,427, May 29, 1985, Pat. No. 4,654,962. This application Mar. 10, 1987, Ser. No. 23,991

Int. Cl.[4] H01P *11/00*

U.S. Cl. 29—600 **3 Claims**



1. A process of fabricating a waveguide comprising the steps of:

forming an internal waveguide element including (1) two spaced flat metal plates having right and left longitudinal edges annd (2) two spaced arcuate metal plates, each joined at its opposite ends to the two same right and left longitudinal edges respectively of the flat metal plates;

thereafter attaching a separate, external circumferential member to the thus-formed internal waveguide element so as to provide an external circular cross-sectional configuration for the waveguide.

4,885,840

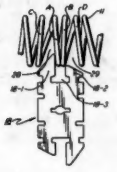
METHOD OF ATTACHING AN INSULATOR BLOCK WITH A T-SLOT TO A COIL

John R. McManus, Marcellus, N.Y., assignor to Carrier Corporation, Syracuse, N.Y.

Continuation of Ser. No. 92,815, Sep. 9, 1987, Pat. No. 4,807,488. This application Dec. 5, 1988, Ser. No. 279,686

Int. Cl.[4] H05R *3/00*

U.S. Cl. 29—611 **2 Claims**



1. A method for attaching an insulator block having at least one pair of arms with a T-slot including a cross bar located between the pair of arms to a coil including a plurality of loops comprising the sequential steps of:

fixedly locating the coil;

selecting a pair of loops of the coil having at least one loop on each side of the selected pair of loops;

forcing the selected pair of loops together by the application of force while forcing the at least one loop on each side of the selected pair of loops away from the selected pair of loops by the application of force so as to create a pair of openings;

putting one pair of arms of the insulator block into the previously created pair of openings such that the selected pair of loops is forced into the cross bar of the T-slot formed in the insulator block; and

after the selected pair of loops is forced into the cross bar, releasing the forces acting on the selected pair of loops and on at least one loop on each side of the selected pair of loops.

4,885,841

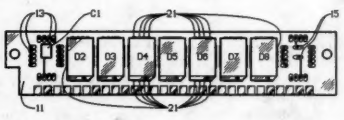
VIBRATIONAL METHOD OF ALIGNING THE LEADS OF SURFACE-MOUNT ELECTRONIC COMPONENTS WITH THE MOUNTING PADS OF PRINTED CIRCUIT BOARDS DURING THE MOLTEN SOLDER MOUNTING PROCESS

John P. McNabb, Boise, Id., assignor to Micron Technology, Inc., Boise, Id.

Filed Feb. 21, 1989, Ser. No. 313,221

Int. Cl.[4] H05K *3/34*

U.S. Cl. 29—834 **16 Claims**



1. A method of solderably attaching the leads of surface-mount electronic components to the connector pads on a printed circuit board such that the leads of each component are positioned in a best-fit centering on their corresponding mounting pads, comprising the steps of:

tinning the leads of the components with solder;

applying a paste comprised of flux and powdered solder to the mounting pads on the printed circuit board;

creating an unsoldered component-board assembly by positioning the components on the printed circuit board such that the leads of the components are roughly aligned with their corresponding connector pads;

heating the unsoldered component-board assembly, while in a substantially horizontal position, to a temperature sufficient to permit the solder tinning on the leads and the powdered solder in the paste to melt and fuse;

applying vibrational energy to the component-board assembly while the solder between the leads and pads is in a fused and molten state;

said vibrational energy being sufficient to overcome the static coefficient of friction between the leads of the components and their respective connector pads to a point where the surface tension of the molten solder will produce a best-fit alignment of the leads of each component on their corresponding connector pads;

said vibrational energy being less than a level which would exert forces on the components greater than those exerted on the components by the surface tension of the molten solder;

halting the application of said vibrational energy while the solder between the leads and pads is in a fused and molten state; and

cooling the component-board assembly, thus allowing the solder between the leads and pads to solidfy.

4,885,842

GUARD AND GUIDE FOR CORN CUTTERS

Clement F. Marley, R.R. 2, Box 165, Nokomis, Ill. 62075

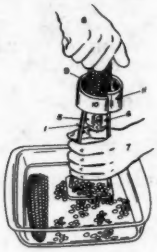
Filed May 12, 1988, Ser. No. 193,031

Int. Cl.[4] A47J *17/02*; B26D *1/02*

U.S. Cl. 30—121.5 **1 Claim**

1. A corn cutting device for cutting kernels of corn from a corn cob comprising a base, two flexible upright legs having a bottom end connected to the base and a top end spaced there-

from and adapted to move toward each other by hand pressure, rigid curved knives attached to said legs intermediate the ends, and a combination guard and guide device attached to the top end of said legs, said guard and guide device comprising opposed, horizontally-mounted U-shaped members spaced



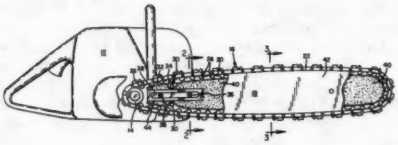
outwardly from the knives, said U-shaped members being spaced above the cutting edges of said knives for protecting the hands of the operator from contacting said knives, one of said U-shaped members being smaller than the other of said U-shaped members to allow the U-shaped members to overlap and move in and out as the knives engage the corn cob.

4,885,843

LAMINATED GUIDE BAR FOR CHAIN SAWS HAVING FOAM CORE

Royal E. Kelsay, III, Oregon City, and Arvin A. Hille, Milwaukie, both of Oreg., assignors to Blount, Inc., Portland, Oreg.

Filed Mar. 18, 1988, Ser. No. 169,995
Int. Cl.[4] B27B *17/02*
U.S. Cl. 30—387 **5 Claims**



1. A guide bar for a chain saw comprising; two outer rigid metal laminates spaced apart in a fixed relationship to define a guide groove along the peripheral edge of the bar, said laminates fixed together in spaced relationship by a foam-adhesive core laminate, said core laminate being a foam activating material that is activated within a confined and determined space defined in part by the outer laminates and molded thereby into a substantially non-deformable pre-determined configuration that adheres through said activation to the outer laminates.

4,885,844

COMPUTER AIDED CUSTOM TAILORING WITH DISPOSABLE MEASUREMENT CLOTHING

Joong H. Chun, 5205 Brougham Ln., Plano, Tex. 75023

Filed Nov. 14, 1988, Ser. No. 271,013
Int. Cl.[4] A41H *1/02*
U.S. Cl. 33—15 **17 Claims**

1. Apparatus permitting factory tailored manufacture of clothing comprising:

(a) body covering means adapted to be worn by a person and having spaced horizontal and vertical measurement lines each marked with measurement indicia for indication of incremental body dimensions of said person;

(b) means for establishing crotch and armpit measurements of said person from a measurement plan;

(c) means for establishing electronic measurement signals representing body covering and crotch and armpit measurements and transmitting said measurement signals to a remote location;

(d) means for receiving said electronic measurement signals at said remote location; and

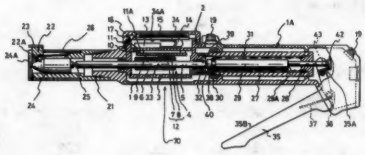
(e) an adjustable mannequin at said remote location being adjustable to a body configuration and size corresponding to said electronic measurement signals and permitting tailored clothing to be manufactured that will fit the person without further alteration.

4,885,845

INNER DIAMETER MEASURING MACHINE

Takeshi Yamamoto, and Masanori Arai, both of Kawasaki, Japan, assignors to Mitutoyo Corporation, Tokyo, Japan

Filed May 19, 1988, Ser. No. 196,121
Claims priority, application Japan, May 20, 1987, 62-124682; May 20, 1987, 62-124683
Int. Cl.[4] G01B *5/12*
U.S. Cl. 33—544.5 **9 Claims**



1. An inner diameter measuring machine comprising:

housing means defining an elongated main body of said measuring machine having at one end thereof a measuring element supporting portion and at the other end thereof a handle portion;

a spindle and first support means on said main body of said measuring machine for supporting said spindle for axial movement relative to said main body;

at least one measuring element and second support means for supporting said at least one measuring element for movement in first and second directions perpendicularly intersecting the axial direction of movement of said spindle;

displacement measuring and displaying means mounted on said housing means intermediate said measuring element supporting portion and said handle portion, said displacement measuring and displaying means having an encoder for detecting a displacement value of the relative movement between said spindle and said housing means and a display device for displaying said displacement value;

manually operable means mounted on said handle portion for facilitating said movement of said measuring element in said first direction in response to a manual gripping of said manually operable means, said manually operable means also including means for effecting a movement of said measuring element in said second direction in response to said manually operable means being free of any manually operative force applied thereto;

a group of first switches for setting measuring conditions, provided on said displacement measuring and displaying means;

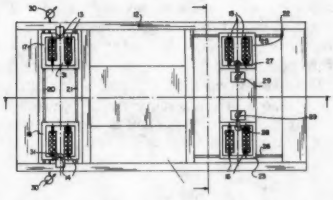
plural groups of operatively redundant second switches provided at plural locations on said handle portion capable of being operated by either the fingers or the thumb on one hand while said manually operable means is gripped by said one hand, whereby a selected one of said plural groups of second switches can be operated by either the fingers or the thumb depending on the way that said one hand grips said handle portion and said manually operable means.

4,885,846

METHOD AND APPARATUS FOR ADJUSTING THE WHEELS AND AXLES OF MOTOR VEHICLES

Istvan Németh, Szigethalom; Béla Simon, Budapest, and István Németh, Szigethalom, all of Hungary, assignors to Gépjarmü Javító Kisszövetkezet, Szigethalom, Hungary

Filed May 19, 1988, Ser. No. 196,376
Int. Cl.[4] G01B 5/255
U.S. Cl. 33—203.13 **7 Claims**



1. The method of determining the relative position of the wheels of a motor vehicle, in particular, wheels suspended with adjustable radius rods (Panhard rods) to the motor vehicle, and adjustment thereof if necessary, characterized in that

(a) all the wheels of the motor vehicle are put simultaneously onto pairs of rollers, the axes of which extend perpendicularly to the longitudinal axis of the motor vehicle occupying the ideal position,

(b) the rollers on the right and left sides are uniaxial,

(c) at least one of the rollers of each pair of rollers is put into rotation by means of an external force,

(d) the motor vehicle being supported laterally on both sides and at least on two places along its longitudinal axis,

(e) the magnitude and direction of the lateral supporting forces being measured at said places,

(f) said supporting forces being reduced to zero by the adjustment of the adjustable rods suspending the wheels,

(g) thereafter measuring the angle enclosed by the longitudinal axis of the vehicle and the axis of the rollers,

(h) measuring the relative position of the midpoint of the wheel track and the longitudinal axis of the motor vehicle, and

(i) by regulating the adjustable radius rods suspending the wheels, eliminating the difference between the longitudinal axis of the motor vehicle and the midpoint of the wheel track and setting the angle enclosed between the longitudinal axis of the vehicle and of the rollers to 90°.

4,885,847

GOLF CLUB MEASURING AND FITTING APPARATUS

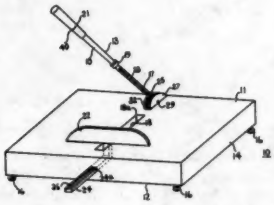
Craig M. Korfants, 203 E. Melrose, Boise, Id. 83706

Filed Feb. 29, 1988, Ser. No. 161,764
Int. Cl.[4] G01B 5/00
U.S. Cl. 33—508 **9 Claims**

1. Apparatus for measuring and fitting a golf club to a particular golfer comprising:

a flat base;

an elongated shaft having a lower end and an upper end, said shaft pivotally mounted at said lower end for pivotal movement about an axis parallel to said flat base and orthogonal to the axis of said elongated shaft at a pivot point on said flat base adjacent a front edge of said flat base, said elongated shaft having an extensible upper shaft section such that said elongated shaft is adjustable in length, said elongated shaft inclined towards a back edge of said flat base at an adjustable angle with respect to said flat base;



means for clamping said extensible upper shaft section in different extended positions;

angular indicator means including a marker and an angular indicia scale to indicate said adjustable angle;

a toe plate slidably mounted on said flat base to indicate the position of said particular golfer's feet on said flat base; and

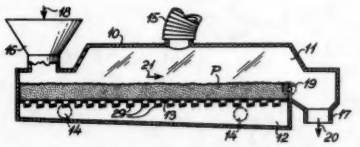
a linearly graduated scale for measuring the distance between said toe plate and said pivot point.

4,885,848

FLUID BED DRYER AND A BED PLATE THEREFOR

Mogens A. Christensen, Virum, Denmark, assignor to A/S Niro Atomizer, Soborg, Denmark

Filed Jul. 13, 1988, Ser. No. 218,554
Claims priority, application Denmark, Jul. 14, 1987, 3666/87
Int. Cl.[4] F26B 17/00
U.S. Cl. 34—57 R **18 Claims**



10. A bed plate for a fluid bed dryer, said bed plate having a plurality of gas distributing openings defined therein, the openings of the bed plate being arranged in pairs of substantially oppositely directed openings, the area of one of the openings in each pair exceeding that of the other, a depressed portion of the plate extending between the openings of each pair.

4,885,849

INSOLE

Blair W. Lambert, Albemarle, N.C., assignor to Space Age Enterprises, Inc., Albemarle, N.C.

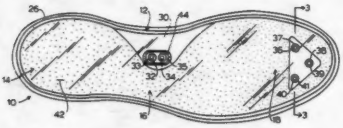
Filed Jun. 24, 1988, Ser. No. 211,813
Int. Cl.[4] A43B 7/06, 13/38, 13/40
U.S. Cl. 36—3 B **4 Claims**

1. An insole to be placed between a wearer's foot and a shoe, comprising:

(a) a top wall and a bottom wall, each constructed from an

air-impervious flexible material, heat-sealed at their peripheries in a side wall ridge to form an envelope, the envelope as seen in plan, tracing the outline of a human foot and having a heel zone, intermediate zone, and a front zone;

(b) a plurality of vent openings in the intermediate and front zones only of the top wall constructed and arranged so that the total area of the vent openings in the front zone is greater than the total area of the vent openings in the intermediate zone;



(c) a pad of cushioning material contained inside the envelope and spanning the interior of the envelope; and

(d) a plurality of holes in the pad in registry with the vent openings of the upper surface of the envelope, wherein the diameter of each hole is slightly greater than the diameter of each respective vent opening; whereby as the wearer of the insole walks and asserts pressure on the heel zone, a greater amount of air is forced from the envelope through the vent openings in the front zone than is forced through the vent openings in the intermediate zone, said insole having no holes or vent openings in the heel zone.

4,885,850

CLOSURE AND SECURING DEVICE, PARTICULARLY FOR SKI BOOTS

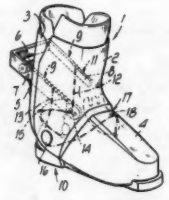
Mariano Sartor, Montebelluna, and Mario Gonella, Spinea, both of Italy, assignors to Nordica S.p.A., Montebelluna, Italy

Filed Mar. 25, 1988, Ser. No. 173,216

Claims priority, application Italy, Apr. 2, 1987, 82531 A/87; Jun. 2, 1987, 82556 A/87

Int. Cl.[4] A43B *5/04*; A43C *11/00*

U.S. Cl. 36—119 **23 Claims**



1. Closure and securing device, particularly for rear-entry ski boots, of the kind having a shell including a sole and a rear quarter, rearwardly having a transverse set of teeth, and a front quarter, both pivoted to said shell and further including at least one foot presser internal to said shell, the device comprising a rod-like element embracing said rear quarter external to said shell and having a locking-release element cooperating with said set of teeth, said rod-like element being operatively connected to said foot presser and having a U-shaped form and comprising two flaps articulated at their ends to said shell, wherein said rod-like element comprises supported on said flaps thereof a transverse roller facing and interacting with said transverse set of teeth and means for connecting said rod-like element with said foot presser.

4,885,851

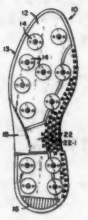
SHOESOLE FOR GOLF SHOE

William R. Peterson, Braintree, Mass., assignor to Tretorn AB, Helsingborg, Sweden

Filed Dec. 30, 1987, Ser. No. 139,857

Int. Cl.[4] A43B *5/00*; A43C *15/00*

U.S. Cl. 36—127 **35 Claims**



1. A golf shoe comprising an upper and bottom, said bottom embodying a heel end portion, an instep portion and a toe portion defining a tread surface, spikes attached to the tread surface of the bottom at the toe portion and heel end portion and a plurality of protrusions formed integral with the tread surface of the bottom and disposed adjacent an edge thereof at the forwarding-facing sides of the golf shoe for right and left-hand golfers, comprising a single line of protrusions at said edge extending from the toe portion to the heel end portion and a plurality of protrusions at said instep portion.

4,885,852

SNOW REMOVAL APPARATUS AND METHOD

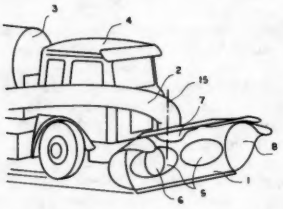
Bjoern J. Gudmundsson, 650 Laugar, S-Thing, Holabraut, Iceland

Filed Jul. 23, 1987, Ser. No. 76,626

Claims priority, application Iceland, Jul. 23, 1986, 3130

Int. Cl.[4] E01H *5/09*

U.S. Cl. 37—260 **8 Claims**



1. Snow removal apparatus for a vehicle to remove snow from a roadway or the like comprising:

a forwardly curved scraper blade having top and bottom edges and defining a generally circular in cross-section passageway within the confines of said curved blade;

said passageway extending longitudinally the length of said blade;

an air blower operable to provide a positive expelling of air pressure; and

an aerodynamic air channel communicating between said air blower and scraper blade passageway; said air channel having a gradually changing cross section, said air channel thereby allowing flow of said air and preserving the kinetic energy of said air; whereby

positive air pressure produced upon operation of said air blower is directed horizontally to the ground and at an angle forward to one side of said blade, into said passage-

way so that during forward movement as said blade bottom edge lifts snow upward from a roadway and the snow enters said passageway and is entrained within, expelling air therein and subsequently expelling from said passageway with the expelling air conveying the snow from an end of said blade passageway laterally over the roadside,

said scraper blade includes at least one aperture therethrough spaced from the ends thereof; said aperture having a cross section substantially as large as the cross section of said air channel and

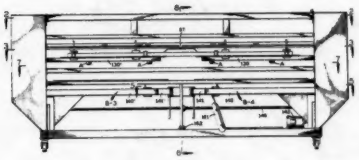
said air channel joined to said blade about said aperture.

4,885,853

SPREADER FEEDER APPARATUS

Stanley G. McCabe, Lubbock, Tex., assignor to Jensen Corporation, Ft. Lauderdale, Fla.

Filed Feb. 23, 1989, Ser. No. 314,177
Int. Cl.[4] D06F *67/04*
U.S. Cl. 38—143 **17 Claims**



1. In a spreader apparatus having an entry side and an exit side, and a conveyor located away from the entry side in the direction of the exit side of the apparatus and operative to carry a laundry flatwork piece away from the entry side in the direction of the exit side of the apparatus, the improvement which comprises:

hanger clamp means for releasably holding a laundry flatwork piece near its opposite top corners:

means for moving said hanger means in a predetermined path above the level of said conveyor away from the entry side of the apparatus and toward the exit side of the apparatus;

spreader means located above the conveyor and between the conveyor and said entry side of the apparatus, said spreader means being operative to spread said laundry flatwork piece in opposite directions laterally;

and transfer means located below said spreader means and operative, after said spreader means has spread said laundry flatwork piece, to deposit said laundry flatwork piece on said conveyor.

4,885,854

PICTURE FRAME FORMED FROM UNITARY BLANK

Hal M. Brandes, Mill Valley, Calif., assignor to Picturemates Corporation, San Francisco, Calif.

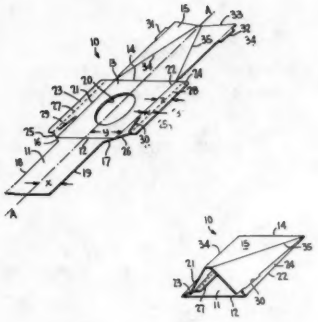
Filed Aug. 12, 1983, Ser. No. 524,168
Int. Cl.[4] A47G *1/06;* G09F *1/12*
U.S. Cl. 40—152.1 **20 Claims**

1. A picture frame formed from a unitary blank comprising:

a front panel section having first and second edges corresponding to first and second fold lines, respectively, defined in said unitary blank, front and rear surfaces, and a viewing aperture defined therethrough to permit viewing from in front of said front surface of a picture disposed against said rear surface;

an intermediate panel section secured to said first edge of said front panel section and folded along said first fold line through substantially 180° into adjacency with the rear surface of said front panel to overlie at least a portion of said viewing aperture, said intermediate panel section having a smaller area than said front panel section to thereby expose a portion of the rear surface of the front panel section;

a rear panel section having inner and outer surfaces a transversely-extending support edge and first and second longitudinally-extending edges, said rear panel section being secured to said second edge of said front panel section and folded along said second fold line behind both said front panel section and said intermediate panel section such that the intermediate panel section is disposed between the rear surface of the front panel section and the inner surface of the rear panel-section, and such that said support edge is



disposed proximate said first edge, said rear panel section having at least a third fold line defined therein and intersecting said support edge; and

support means for selectively attaching and detaching said first and second longitudinally-extending edges of said rear panel to said portion of the rear surface of said front panel section when said rear panel section is folded along said third fold line to render the outer surface of said rear panel section generally convex, to thereby permit said picture frame t be supported on said first and support edges in an upright position.

4,885,855

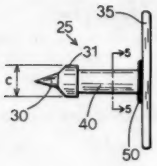
ANTIBACTERIAL ATTACHMENT

George B. Marks, Sr., Hudson, Wis., and D. Michael Fearing, St. Paul, Minn., assignors to Fearing Manufacturing Co., Inc., South St. Paul, Minn.

Continuation of Ser. No. 427,742, Sep. 29, 1982, abandoned. This application Apr. 8, 1985, Ser. No. 721,126
Int. Cl.[4] G09F *3/00*
U.S. Cl. 40—301 **11 Claims**

8. An animal tag for attachment to a wound in the flesh of an animal, the tag including means bearing a dry durable antisep-

tic-containing coating positioned to contact the wound, the coating being serum-soluble to release the antiseptic at the



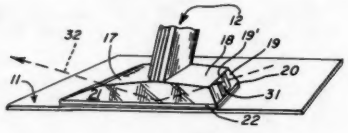
wound site when contacted with serum from the wound to thereby inhibit bacterial infection.

4,885,856

OPTICAL PRISM DISPLAY DEVICE

Robert K. Cameron, Chicago, Ill., assignor to Panel Graphics, U.S.A., Inc., Chicago, Ill.

Filed Nov. 16, 1987, Ser. No. 121,125
Int. Cl.[4] G09F *19/14*
U.S. Cl. 40—453 **8 Claims**



4. A novelty acrylic display carrying visual effects or messages which may appear and disappear to a person moving relative to the display comprising:

a block of acrylic material having upper and lower planar polished surfaces spaced apart by the thickness of the block,

a planar front polished surface on the block joining said upper and lower surfaces and slanted rearwardly from said lower surface toward said upper surface at about 32° to said lower surface when horizontal,

a sheet of material underlying and appended to said block and having an air interface between the polished bottom surface of the block and said underlying sheet of material,

a first message carried on the block upper surface in a position adjacent said slanted front surface so that said message may be directly viewed and a mirror image reflection thereof on said lower block surface may be viewed through said slanted front surface, said mirror image reflection appearing and disappearing from view to a person moving relative to the display as the angle of viewing changes relative to the critical angle of incidence of the acrylic planar polished bottom surface,

a second message carried on said block lower surface positioned below and relative to the first message to be viewed through said slanted front surface, said second message having alternatively appearing locations, one location appearing to be suspended between the first message direct-viewing location and its mirror image reflection and another location appearing to be on said bottom polished surface, such apparent locations changing as the angle of viewing changes relative to the critical angle of incidence of the acrylic planar polished bottom surface,

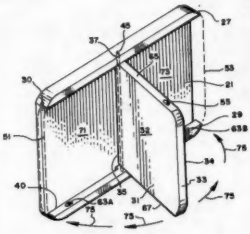
a third message carried on said appended sheet in a position underlying the said block front slanted surface so that same will appear and disappear from view to a person moving relative to the display as the angle of viewing changes relative to the critical angle of incidence of the acrylic block polished bottom surface.

4,885,857

TWO-POSITION SIGNAL DEVICE

David Leflet, 8610 NW. 178th St., Miami, Fla. 33015

Continuation-in-part of Ser. No. 165,976, Mar. 9, 1988. This application Feb. 17, 1989, Ser. No. 311,043
Int. Cl.[4] G09F *19/00*
U.S. Cl. 40—533 **21 Claims**



1. A signal device adapted for use with a primary object comprising:

a generally rectangular base plate having a major plate surface,

a pair of substantially parallel flanges upstanding along opposite edges of said major plate surface,

a signal panel having two major opposed panel surfaces, said panel being pivotally mounted on said flanges and adapted to be rotated between two different signaling positions against said base plate between said flanges,

means for releasably holding said signal panel in each of said two different positions against said base plate by a press fit between said flanges,

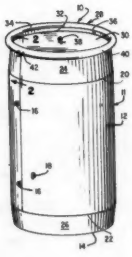
and means for attaching said base plate to a primary object, such as an office file or the like.

4,885,858

INFLATABLE PLASTIC STRUCTURE SIMULATING A BEVERAGE CAN OR BOTTLE WITH CAPPED END

David H. Strom, Chicago, Ill., assignor to Strom International, Ltd., Chicago, Ill.

Filed Feb. 10, 1988, Ser. No. 154,375
Int. Cl.[4] G09F *1/08*
U.S. Cl. 40—538 **18 Claims**



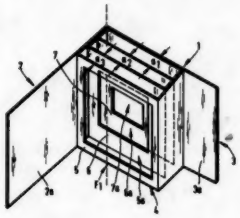
1. An inflatable structure simulating a beverage can or bottle with a capped end comprising:

a tubular flexible body having an annular wall and a bottom end portion sealingly secured thereto; and

an upper end portion sealingly secured to an upper end of

said wall to form an annular lip projecting vertically from said body, said lip adapted to be folded over said end of said wall to resemble a capped end of a beverage can or bottle, said lip being provided with a flexible tubular ring sealingly secured to an outer edge margin thereof and adapted to be inflated separately from said body.

4,885,859
FOLDING CARD
Joachim Gasser, Kirchdorf, Fed. Rep. of Germany, assignor to Refeka Werbemittel GmbH, Munich, Fed. Rep. of Germany
Filed Apr. 28, 1988, Ser. No. 187,363
Int. Cl.[4] B42D *15/04*; G09F *1/08*
U.S. Cl. 40—539 **13 Claims**



1. A folding card with a cover that is connected to a back by at least one fold line and with an internal folding system that is connected at least to the inside surface of the back, can assume a three-dimensional form when the card is opened, and has at least two superimposed frame elements that change their relative positions when the card is unfolded, wherein:

the frame elements (**5**, **6**, **7**) form Windows (**5***a*, **6***a*, **7***a*) of differing sizes whereby the size of the windows (**5***a*, **6***a*, **7***a*), beginning with the frame element (**7**) closest to the inside surface (**3***a*) of the back (**3**), increases in the order of the successively overlapping frame elements (**5**, **6**, **7**); and

the folding system (**4**) has a support frame (**12**) with a bottom side (**15**), two side walls (**13**, **14**) and a top side (**16**), whereby the top side (**16**) is the frame element (**5**) with the largest window (**5**) and whereby the top side (**16**), the side walls (**13**, **14**) and the bottom side (**15**) are attached to each other by fold lines (F_2, F_3, F_4, F_5) and form a cuboid when the cover is unfolded to a 90° position with respect to the back (**3**) (FIG. **3**).

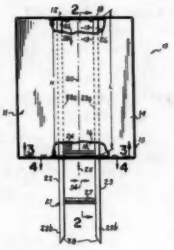
4,885,860
YARD SIGN
Robert C. Huenefeld, Cincinnati, Ohio, assignor to Dee Sign Co., Cincinnati, Ohio
Filed Sep. 22, 1988, Ser. No. 247,731
Int. Cl.[4] G09F *15/00*
U.S. Cl. 40—606 **6 Claims**

1. A sign comprising

two display panels, each of said display panels having a display surface, each of said display panels being in the form of a pan, said pans being nested together one within the other so that a cavity is provided between said display surfaces thereof,

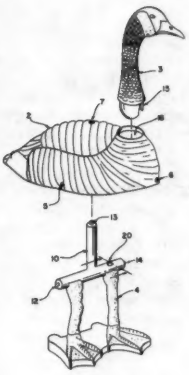
an H-shaped support frame comprising two legs and a crossbar, said crossbar and that portion of each leg extending above said crossbar being located interiorly of said nested display panel pans, that portion of each leg extending below said crossbar being located exteriorly of said nested display pans, and the top end of at least one leg being butted against the interior top edge of said nested pans to prevent said pans from sliding down on said support frame and at least a portion of said crossbar being butted against the interior bottom edge of said nested pans to prevent said pans from sliding up on said support frame,

port structure defined in the bottom edge of said nested pans, said port structure being sized and configured to cooperate with said two legs so as to prevent substantial side to side motion of said panels relative to said frame, and



restraining means applied to the mating edges of said display panel pans to hold said display panels in nested configuration, said H-shaped support frame being trapped between said display panels so that said H-shaped support frame need not be fixed to either of said display panels by separate fasteners.

4,885,861
STANDING GOOSE DECOY
Richard S. Gazalski, Hwy. 75 N., P.O. Box 937, Henryetta, Okla. 74437
Filed Jan. 19, 1989, Ser. No. 299,051
Int. Cl.[4] A01M *31/06*
U.S. Cl. 43—3 **1 Claim**



1. A waterfowl shell decoy comprising a removable neck and head piece a shell body and a leg and foot assembly wherein said shell body includes neck hole means for receiving a simulated neck and head piece resembling a waterfowl and at least three grommet reinforced holes located on the sides and top of the shell in a vertical plane,

said neck and head piece being received in said neck hole in friction tight engagement provided by a clam shell shaped elongated segment of slightly larger circumference than said neck hole diameter and which extends from said neck and head piece below said neck hole when in place, and said leg and foot assembly includes an inverted T-shaped mounting bracket containing protrusions extending be-

yond the terminus of said T-shaped bracket, said bracket being sized so that said termini do not extend beyond the flexure limits of said shell and said protrusions are received in engagable disengagable relationship with said grommet holes in said shell, said leg and foot assembly further including a unitary hollow simulated legs and feet assembly capable of being weighted with material placed inside their hollow interior, whereby said shell decoy can stand upright with weighted feet to simulate a standing full bodied waterfowl decoy.

4,885,862

GAFFS, AUTOMATIC GAFFS, AND MECHANISMS THEREFOR

Timothy Thayer, 13411 Oakledge, Houston, Tex. 77065

Filed Apr. 10, 1989, Ser. No. 336,011
Int. Cl.[4] A01K *97/14*
U.S. Cl. 43—6 **9 Claims**

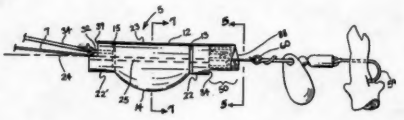
1. An automatic gaff comprising
a handle having a first end and a second end,
a hook movably mounted to the first end of the handle,
a releasable spring-loading mechanism having a spring therein, the spring-loading mechanism operatively connected between the hook and the handle for providing releasable spring tension of the spring on the hook, for moving the hook toward the second end of the gaff,
an automatic trigger mechanism connected to the spring-loading mechanism for automatically releasing the spring tension of the spring when a thing to be gaffed comes into contact with a part of the automatic trigger mechanism so that the spring forcefully moves the hook toward the second end of the handle, and
a cocking mechanism means for restricting a spring of a spring loading mechanism comprising:
(a) cocking handle,
(b) cocking lever,
(c) drive link,
(d) axial pin;
(e) driven link,
(f) expansion spring,
(g) gaff piston, and
(h) locking bar,
whereby, the cocking lever rotates the axial pin forcing the drive link against the driven link, the driven link pushes the expansion spring against the gaff piston forcing the piston further out of the gaff handle until the locking bar of the automatic trigger engages a locking groove on the piston, thus holding the piston stationary, the cocking handle is now rotated back to the gaff handle, whereby the axial pin is rotated, pulling the drive link against the driven link, the driven link is connected to one end of the expansion spring, where the other end of said expansion spring is connected to the piston; therefore, when the driven link is pulled into place the expansion spring is restretched and the gaff is then ready for use.

4,885,863

FISHING LURE RETRIEVER

Michael M. Sprague, 16843 4th Ave., South, Seattle, Wash. 98148

Filed May 25, 1988, Ser. No. 198,323
The portion of the term of this patent subsequent to Jul. 12, 2005, has been disclaimed.
Int. Cl.[4] A01K *97/00*
U.S. Cl. 43—17.2 **8 Claims**



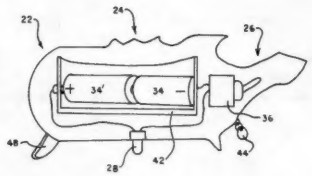
1. A fishing lure retriever comprising:
a weighted body, including engaging means for slidably engaging a fishing line attached to the lure, said engaging means defining an axis with respect to the body, said body including an elongate upper portion and ballast for providing a center of gravity beneath said axis between the ends of the weighted body; and
a plurality of trap hooks of varying lengths, fixedly projecting from the body and radially disposed about the axis and defining a channel of hooks that is located about the axis.

4,885,864

FISHING LURE USING INFRARED ATTRACTING MEANS

Barbara A. Carner, 9916 Dickens Ave., Bethesda, Md. 20814

Filed Sep. 14, 1988, Ser. No. 244,022
Int. Cl.[4] A01K *85/00*
U.S. Cl. 43—17.5 **6 Claims**



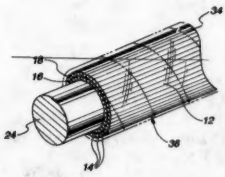
1. A fishing lure, comprising:
a watertight fishing lure shaped body,
an infrared source mounted to said body,
energy supply means within said body for stimulating said source to emit infrared radiation and wherein said energy supply means includes
energy storage means for providing energy for said infrared source.

4,885,865

GRAPHITE FIBER REINFORCED ROD CONSTRUCTION

James T. Rumbaugh, Tai Chung, Taiwan, assignor to Berkley, Inc., Spirit Lake, Iowa

Filed Jul. 31, 1986, Ser. No. 892,755
Int. Cl.[4] A01K *87/00*
U.S. Cl. 43—18.5 9 Claims



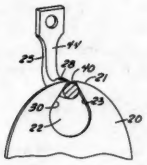
1. A fishing rod having a flexible resilient hollow tapered body of generally circular exterior cross section, tapering from a large diameter handle end to a small diameter tip end, the rod having a hollow interior extending along the rod axis, tapering in the same direction as the exterior of the rod, the rod body being constructed of a laminar resinous matrix reinforced with continuous contiguous parallel graphite or silicon carbide fibers, with the fibers unidirectionally longitudinally aligned to the axis of the rod.

4,885,866

SPOON AND MOUNT

Allen P. Vanderplow, 5712 Glenwood Dr., Racine, Wis. 53406

Filed Jun. 10, 1988, Ser. No. 204,903
Int. Cl.[4] A01K *85/00*
U.S. Cl. 43—42.19 14 Claims



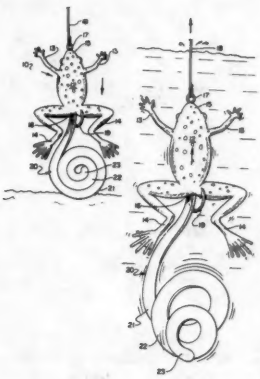
1. In fishing lure apparatus of the type including a spoon, having a front end and a mounting hole with a leading edge portion and leading edge centerpoint toward the front end, and a substantially rigid loop with a spoon-engagement portion extending through the hole, the leading edge and spoon-engagement portions being primary contact portions of the spoon and loop, respectively, and the hole being sufficiently larger than the cross-section of the spoon-engagement portion of the loop to allow substantial freedom of relative movement of the spoon and loop, the improvement comprising the leading edge portion being formed by a pair of opposed, forwardly-extending, substantially symmetrical, non-circular edge lines converging toward the leading edge centerpoint to elongate the hole in a direction toward the centerpoint, whereby engagement of the loop is focused toward the centerpoint of the leading edge portion of the spoon as the lure apparatus is drawn through water.

4,885,867

SIMULATED FROG FISHING LURE

Vitervo Leal, 4744 N. Whipple, Chicago, Ill. 60625

Continuation-in-part of Ser. No. 121,093, Nov. 6, 1987, abandoned. This application Oct. 24, 1988, Ser. No. 261,348
Int. Cl.[4] A01K *85/00*
U.S. Cl. 43—42.26 5 Claims



1. An improved fishing lure comprising

a simulated frog body section of the type having a forward end including a fishing line mounting ring and a rear section,

a fishing hook mounted on said rear section of said frog body section, and a rear bellows-like tail section having a plurality of coil sections,

said bellows-like tail section retaining a coiled configuration in the rest position and in the expanded position and avoiding an extended linear configuration when water pressure is applied there against,

said rear bellows-like tail section formed of a plasticized material which has a self-memory to maintain a tightened bellows configuration when at rest and is sufficiently pliable to expand into an expanded bellows configuration in response to the application of water pressure there against,

said rear bellows-like tail section creating a circular vibratory motion when in the expanded disposition during use.

4,885,868

BANDING TECHNIQUES FOR PLANT PROPAGATION

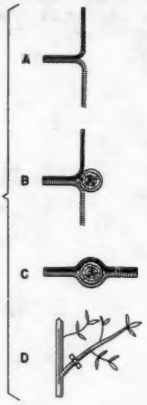
Brian K. Maynard, and Nina L. Bassuk, both of Ithaca, N.Y., assignors to Cornell Research Foundation, Inc., Ithaca, N.Y.

Continuation of Ser. No. 937,586, Dec. 3, 1986, abandoned. This application Jul. 15, 1988, Ser. No. 219,819
Int. Cl.[4] A01G *7/00*
U.S. Cl. 47—58 12 Claims

1. A method of preparting a cutting propagule which comprises:

(a) banding a parent plant in an area of succulent growth, which after severing will be the base of the cutting propagule, with a strip of opaque, flexible separable hook and loop fastener so that light is excluded and so that a portion of the hooks and loops of the fastener are in intimate contact with said banded area, wounding the area, for a time sufficient so that a reaction to light exclusion is evident in the banded area and the ability of the cutting

propagule to root is enhanced by the action of the loops and the hooks against the area of succulent growth;



(b) severing plant material comprising the banded area from the parent plant near the banded area to provide the cutting propagule.

4,885,869

AUTOMATIC WATER-SUPPLYING FLOWERPOT UTILIZING THE CAPILLARY ACTION AND ITS WATER-SUPPLYING CONTROL METHOD

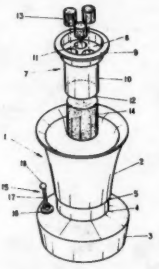
Young K. Kim, 220-2, Suyu-dong, Dobong-gu, Seoul, Rep. of Korea

Filed Oct. 12, 1988, Ser. No. 256,571

Claims priority, application Rep. of Korea, Oct. 21, 1987, 17926/1987[U]

Int. Cl.[4] A01G *9/02*

U.S. Cl. 47—66 **2 Claims**



1. A flower pot utilizing capillary action for supplying water to a plant, comprising,

an upper pot for containing soil for raising a plant, a lower pot for storing water, and an intermediate portion for integrally connecting the said upper pot and the lower pot, said lower pot having a filling hole and an indicating float,

a water supply control tube having an upper end provided with a flange, said upper pot having an annular step for receiving said flange and for suspending the water supply control tube, said water supply control tube having a large downwardly facing bore for receiving a major absorption member, said water supply control tube having a top plate forming a boundary between the upper pot and the lower pot, said top plate having a plurality of small bores formed therein; and

a plurality of minor absorption members insertable into the said small bores, said minor absorption members being insertable in and removable from said small bores to change the number of said minor absorption members in order to adjust the delivery of water into the upper pot from the lower pot depending on the water requirement of the plant involved.

4,885,870

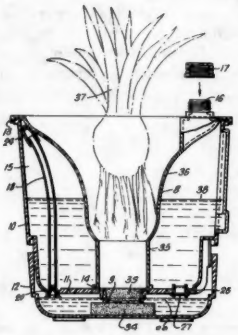
PLANT CONTAINER

Hanry Fong, 3rd Floor, Flat 12, 82 Fu Yan Street, Kwun Tong, Kowloon, Hong Kong

Filed May 17, 1988, Ser. No. 194,755

Int. Cl.[4] A01G *27/00*

U.S. Cl. 47—79 **15 Claims**



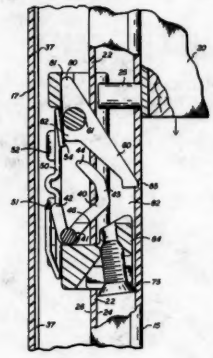
1. A plant container comprising an inner wall forming a pot, which is arranged to contain a plant in a growing medium and which has water inlet means adjacent a bottom thereof; an outer wall which surrounds said inner wall to provide therebetween a water reservoir; a dish which is located beneath said walls and which is capable of containing water at least up to the level of said water inlet means of said pot, said reservoir being provided adjacent to a top thereof with a filling opening, which is provided wiyth a removable air-tight closure, and which is provided adjacent to a bottom thereof with an outlet aperture opening into said dish; and a vent duct, a lower end of which opens through said bottom of said reservoir into said dish at a level above said water inlet means of said pot, an upper end of said vent duct opening into an upper part of said reservoir; the arrangement being such that, in use, when the water in said tray is depleted so that said lower end of said vent duct is exposed, air can enter said reservoir through said vent duct and allow water to flow out of said reservoir through said outlet aperture into said tray; wherein there is a constriction adjacent to said lower end of said vent duct having a cross-sectional area smaller than the cross-sectional area of said vent duct to prevent large air bubbles from rising up said vent duct that might force water out of the top of said vent duct into said reservoir; said vent duct being a pipe, a lower end of which is sealed to an opening in an annular bottom wall interconnecting lower ends of said inner and outer walls; said pipe being sealed to said opening in said bottom wall by means of a tubular plug which is fitted in said opening in the bottom wall and has an upwardly projecting spigot over which said lower end of said pipe is fitted, said plug having a passageway providing said constriction.

4,885,871

AUDIBLY LOCKING SHOE SYSTEM FOR TAKE-OUT WINDOW

Norman R. Westfall; James A. Martini, and John I. Habbersett, all of Rochester, N.Y., assignors to Caldwell Manufacturing Company, Rochester, N.Y.

Continuation-in-part of Ser. No. 99,894, Sep. 22, 1987, Pat. No. 4,799,333. This application Sep. 26, 1988, Ser. No. 249,103
The portion of the term of this patent subsequent to Jan. 24, 2006, has been disclaimed.
Int. Cl.[4] E05D *15/22*
U.S. Cl. 49—176 **19 Claims**



1. A take-out sash shoe configured for moving vertically in a channel in an extruded resin jamb liner where said sash shoe receives and moves with a pin of a take-out sash, said pin being laterally withdrawn from said sash shoe when said sash is taken out of said jamb liner, and said sash shoe comprising:

a. a spring-biased ramp latch pivotally mounted on said sash shoe so that a free end of said ramp latch is adjacent a recess in said shoe for receiving said pin;

b. said ramp latch being mounted to pivot from a latch position toward a frame side of said channel when a previously withdrawn pin moves vertically over said ramp latch as said withdrawn pin returns toward said recess in said shoe;

c. said spring-biased ramp latch being arranged to snap into said latch position as said pin moves over said free end of said ramp latch and into said pin-receiving recess so that said ramp latch, in said latch position, locks said pin against vertically moving from said recess; and

d. the snapping of said ramp latch into said latch position being arranged for producing an audible sound indicating that said sash pin is latched into said sash shoe.

4,885,872

GARAGE DOOR OPERATOR WITH PLASTIC DRIVE BELT

James S. Chang, Arlington Heights, and Scott M. Clark, Elk Grove Village, both of Ill., assignors to The Chamberlain Group, Inc., Elmhurst, Ill.

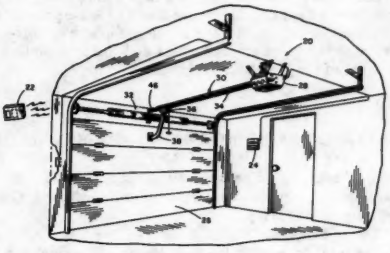
Filed Feb. 1, 1989, Ser. No. 305,606
Int. Cl.[4] E05F *11/00*
U.S. Cl. 49—362 **17 Claims**

1. A garage door operator for moving a garage door between an open position and a closed position, said operator comprising:

a head unit for being fixedly held by a supporting structure positioned remote from said door, said head unit including a motor and a drive wheel having spaced teeth on its periphery for being driven by said motor;

elongate rail means having a first end for being fixedly held by a supporting structure disposed adjacent and above said door, said rail means including a pulley located adjacent said first end, said rail means further including a second end for being fixedly held adjacent to and in alignment with said drive wheel; and

an endless drive belt assembly for training about said drive wheel and said pulley in two runs and for being supported by said rail means, said belt assembly including a length of a plastic belt with teeth on one surface thereof matching the teeth on said drive wheel, said belt assembly further including a trolley means for connection to said garage



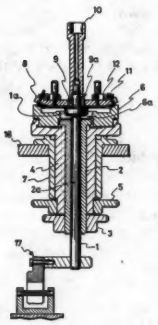
door and a first connector for joining one end of said plastic belt to one end of said trolley means, said plastic belt having a lower surface to which the belt teeth extend, said drive wheel having an upper surface to which the wheel teeth extend, said drive wheel being adapted to engage only said plastic belt component of said belt assembly whereby said belt assembly can be installed by training it around said pulley, moving the plastic belt lower surface over the drive wheel upper surface until their respective teeth are aligned and moving said belt downwardly to train it about said drive wheel.

4,885,873

ABRADING APPARATUS FOR SPHERICALLY SHAPING WORKPIECES

Masashi Miyazaki, Tokyo, Japan, assignor to Seiko Electronic Components Ltd., Japan

Continuation of Ser. No. 817,832, Dec. 17, 1985, abandoned.
This application Aug. 17, 1987, Ser. No. 87,958
Claims priority, application Japan, Apr. 17, 1984, 59-76849
Int. Cl.[4] B24B *13/00*
U.S. Cl. 51—121 **16 Claims**



1. A device for processing the tips of stick-like members spherically, comprising: a rotational wheel; a wheel shaft to which the wheel is fixed; a rotation shaft rotatably and coaxially supported by said wheel shaft within a hollow portion

thereof to undergo rotation about an axis of rotation; a jig board fixing rod which is axially slidably inserted into an eccentricity hole eccentric from the rotational axis of said rotation shaft by a predetermined amount so that the jig board fixing rod undergoes a gyratory movement around the rotational axis of the rotation shaft; a jig board fixed to said jig board fixing rod for holding the stick-line members thereon so as to grind and polish the tips of the stick-like members in frictional contact with the wheel under the application of the weight of the jig board fixing rod and the jig board, said wheel having an abrading spherical surface contacting with the tips of the stick-like members; and a spherical bearing fixed to the jig board fixing rod for movably supporting the jig board therearound so as to enable the jig board to undergo an adjusting movement relative to the abrading spherical surface in response to the gyratory movement and the axial sliding displacement of the jig board fixing rod.

4,885,874

METHOD OF GRINDING TWO OR MORE CAMS OF A CAMSHAFT

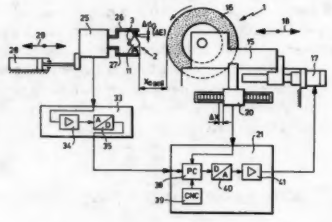
Horst J. Wedeniwski, Remshalden-Grunbach, Fed. Rep. of Germany, assignor to Fortuna-Werke Maschinenfabrik GmbH, Fed. Rep. of Germany

Filed Jan. 27, 1988, Ser. No. 149,108

Claims priority, application Fed. Rep. of Germany, Jan. 29, 1987, 3702594

Int. Cl.[4] B24B *29/00*

U.S. Cl. 51—165.77 **7 Claims**



1. A method of grinding a plurality of cam surfaces on a camshaft, the method comprising the steps of:

defining polar coordinates and a nominal value of a nominal contour of said plurality of cams and storing said coordinates and said nominal value in a memory of a numerical grinding machine control, said nominal value being equivalent to an absolute dimension of said cams at a predetermined position of said surface;

chucking said camshaft in a mounting position between drive means of a workpiece headstock and a tailstock, said drive means being rotatable about a first axis;

rotating said drive means with said camshaft in a first relationship defining a camshaft rotary angle about said first axis versus time;

advancing a rotary grinding wheel along a second axis in a second releationship defining a grinding wheel linear travel along said second axis versus time, said second axis extending perpendicularly to said first axis and being directed towards a first cam surface to be ground on said camshaft, said first and second releationships being defined with respect to each other such as to make a grinding surface portion of said grinding wheel engage said cam surface and follow said nominal contour;

grinding said first cam surface along said nominal contour while rotating said camshaft by 360°;

after grinding said first cam surface measuring an actual value of said absolute dimension at said predetermined position on said first cam surface, with said camshaft being still chucked between said headstock and said tailstock;

comparing said actual value with said nominal value and generating an error signal being equal to a constant multiplied with a difference between said actual value and said nominal value;

adjusting said second relationship by multiplying said linear travel by said error signal;

displacing relative positions of said camshaft and said grinding wheel along said first axis to make said second axis being directed towards a second cam surface to be ground on said camshaft; and

advancing said grinding wheel along said second axis in said adjusted second relationship with said camshaft being still chucked between said headstock and said tailstock and rotated in said first relationship in order to grind said second cam surface.

4,885,875

LENS EDGING MACHINE AND METHOD

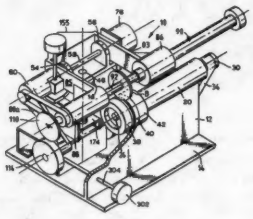
Peter H. Soper, 241 Bilton Road, Rugby, Warwickshire, England

Filed Dec. 30, 1987, Ser. No. 139,875

Claims priority, application United Kingdom, Jan. 5, 1987, 8700066

Int. Cl.[4] B24B *9/14*

U.S. Cl. 51—284 E **9 Claims**



1. A method of grinding the periphery of an article such as an opthalmic lens blank, which method comprises rotating the blank periphery against a grinding wheel and simultaneously rotating a template disposed coaxially relative to the blank and having the desired peripheral configuration of the blank, said template being positioned for cooperation with a follower such that the template causes rotation of the follower when the template and follower are caused to engage one another in response to removal of material from the blank, determining each period of time during which the follower is set into rotation by said template and comparing that period with a predetermined period corresponding to one revolution of the blank, causing the grinding operation to continue if rotation of the follower during said timed period stops due to disengagement between said template and said follower and re-starting the timed period upon recommencement of follower rotation for comparison with the predetermined period, and ceasing the grinding operation when said timed period is equal to said predetermined period.

4,885,876

SANDER TOOL APPARATUS

David R. Henke, Maple Grove, Minn., assignor to Warner Manufacturing Company, Minneapolis, Minn.

Continuation of Ser. No. 905,162, Sep. 11, 1986, abandoned. This application Jun. 17, 1988, Ser. No. 210,213

Int. Cl.[4] B24D *15/02*

U.S. Cl. 51—393 **3 Claims**

1. A sander tool apparatus for use with a sheet of sandpaper, the sander tool apparatus comprising:

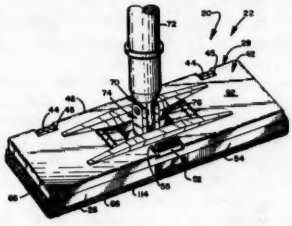
(a) a two-piece housing structure including a molded base structure, a molded top structure, the base structure in-

cluding a substantially planar back surface facing away from the top structure, the top structure including a handle mounting surface facing away from the base structure;

(b) hinge means integrally molded with the housing structure for hingedly interconnecting the base and top structures along a first side of the sander tool apparatus, whereby the sander tool apparatus can be placed in an opened position wherein the base and top structures are hinged apart and a closed position wherein the base and top structures are hinged together;

(c) sandpaper retention means for removably retaining the sandpaper from the back surface of the base structure; and

(d) latch means integrally molded with the housing structure for releasably latching the base and top structures in the closed position; wherein the top structure includes handle joint assembly means for interconnecting an elongated handle member to the top structure, the handle joint assembly means including universal joint means mounted on



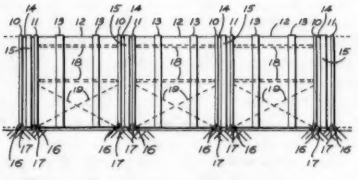
the top structure for allowing the back surface of the base structure to be disposed in a plurality of angular positions with respect to the handle member; wherein the universal joint means includes a u-shaped member straddling pin means of the to structure for pivotal movement about a first axis, free ends of the u-shaped member defining spaced apart, aligned apertures, the handled joint assembly means including handle attachment means for attachment to the handle member, the handle attachment means including pin means for pivotal mounting in the aligned apertures of the u-shaped member for pivotal movement of the handle attachment about a second axis perpendicular to the first axis; wherein the top structure pin means includes an elongated pin member having four equally spaced apart, radially extending ribs, the ribs frictionally engaging the u-shaped member to provide a frictional engagement with the u-shaped member about a selected range of pivotal movement of the u-shaped member.

4,885,877

FRAME STRUCTURE FOR BUILDINGS

Rowland D. Hunt, and Kenneth Gardner, both of Santa Barbara, Calif., assignors to Clamshell Partners Ltd., Santa Barbara, Calif.

Filed Aug. 3, 1988, Ser. No. 228,264
Int. Cl.[4] E04B *1/347, 1/32*
U.S. Cl. 52—2 **17 Claims**



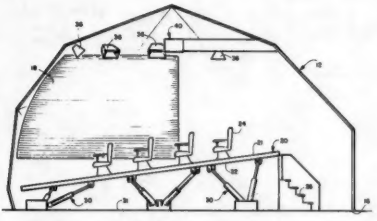
1. A frame structure comprising a plurality of parallel, spaced apart, arched frame assemblies, each frame assembly comprising a pair of parallel closely spaced frames, each frame having a transverse cross-section including a web section extending in a direction parallel to the plane of the frame span; a flange at an outer end of the web section extending laterally on each side at the center end of the web section; and an enclosed groove extending the length of the frame on each side of said web section at said flange, a slot extending through a wall of each groove to provide communication therewith; means connecting the frames of a pair a fixed distance apart at spaced positions along the frames comprising a male plug member on the inner, opposed, surfaces of said web section; a spacer tube engaging at each end over said plug members; and a plate member extending over and attached to the frame; ground support means extending in two spaced apart lines to form support surfaces spaced predetermined distances apart and fastened to the ground, a ground support means for each end of each frame; means at each end of each frame pivotally attaching each end of each frame to the related ground support means; a plurality of wide fabric panels extending between each pair of frames, and a plurality of narrow fabric panels extending between the frames of each pair of frames, the fabric panels including integral tensioning means, each said fabric panel having a beaded edge along each side, the beaded edges positioned in said grooves and the panel extending through said slots.

4,885,878

ADVANCED STATE OF THE ART MOVIE THEATER

George Wuu, 1000 E. Coast Parkway, Singapore 1544, Singapore

Filed Sep. 8, 1987, Ser. No. 93,889
Int. Cl.[4] E04H *3/10*
U.S. Cl. 52—6 **2 Claims**



1. An advanced state of the art movie theater comprising:

a building having walls that form its perimeter, said walls having a bottom edge, said building having a predetermined inner width, said building having an outer configuration that resembles a sphere that is missing its bottom curvature due to a horizontal plane that cuts through the lower half of the sphere and forms its bottom edge, said building is a geodesic dome formed of substantially identical triangular panels;

a platform having a predetermined width that is less than the inner width of said building, said platform having a top surface and a bottom surface;

a concave curved motion picture screen surface upon which a motion picture can be projected, said curved surface encompassing an arc of greater than 180 degrees and less than 310 degrees, said curved motion picture screen surface is the inside wall surface of said building;

said platform being located within said building and having its bottom surface spaced upwardly a predetermined height above the bottom edges of the walls of said building;

support means connected to the bottom surface of said platform for tilting said platform upwardly and downwardly in any direction about its vertical axis about all 360 de-

grees comprising at least three sets of hydraulically telescopic legs having their top ends pivotally connected to brackets connected to the bottom surface of said platform and their bottom ends are pivotally connected to base plates positioned on the support surface, each of said sets having two telescopic legs having a top end and a bottom end, the bottom ends of each respective set of telescopic legs being pivotally mounted adjacent each other while the respective top ends are pivotally mounted to laterally spaced brackets connected to the bottom surface of said platform such that said telescopic legs have an angular slope to them;

said motion picture screen surface surrounding said platform;

a motion picture projector having a 300 degree fish-eye lens that is oriented to project an image on said motion picture screen;

electronic control means for activating said support means for tilting said platform comprising a controller, at least one joystick, an operator console main computer, and a slave computer; and

at least 10 seats mounted on said platform and oriented toward said motion picture screen to accomodate persons viewing a motion picture to be shown.

4,885,879

VAULT STRUCTURE FOR PROTECTION OF ROADWAYS AGAINST SNOW

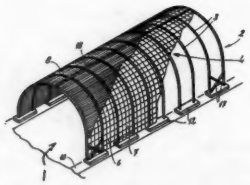
Jean-Louis Plantier, Chemin du Buloz, Saint-Jorioz (Haute-Savoie), France

Filed Feb. 10, 1988, Ser. No. 154,781

Claims priority, application France, Feb. 10, 1987, 87 02032

Int. Cl.[4] E04B *1/12*

U.S. Cl. 52—63 **11 Claims**



1. A vault structure for the protection of a roadway against snow, comprising:

a pair of support surfaces flanking a roadway to be protected from snow accumulation;

a multiplicity of spaced-apart generally stirrup-shaped arches extending over said roadway and having free ends supported on opposite ones of said surfaces, said arches forming a vault skeleton;

a ventilation layer on said skeleton at least partially covering same and open to passage of air while preventing snowflakes from depositing through said structure on said roadway; and

means for detachably fixing said free ends of said arches on said support surfaces, ends on said support surface including a footing block of concrete provided with an upwardly open seat receiving the respective arch end, and a body of cementatious material filling the seat and bonding each said end to the respective block.

4,885,880

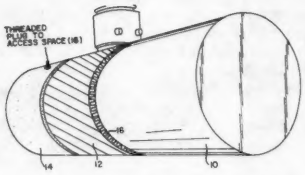
CORROSION INHIBITING SECONDARY BARRIER SYSTEM FOR UNDERGROUND STORAGE TANKS

David A. Sudrabin, and Klaus Grunau, both of Hendersonville, N.C., assignors to Fibrestone Inc., Ft. Myers, Fla.

Filed Sep. 8, 1987, Ser. No. 95,011

Int. Cl.[4] G01M *3/04*; B65D *25/18*

U.S. Cl. 52—169.6 **3 Claims**



1. An underground storage tank system for liquids comprising an inner primary tank, a resilient spacer contacting and surrounding the primary tank and being formed of a material that is substantially impervious to the liquid being stored in the tank, a clothlike material wrapped about the resilient spacer and an outer barrier formed of high strength alkiline resistant glass fiber reinforced cement surrounding the resilient spacer, the resilient spacer being formed of a matted loosely formed relatively stiff material which holds the inner primary tank separated from the outer barrier so that the tank is suspended within the resilient spacer and is separated from the outer barrier and floats in the resilient spacer and does not touch the outer barrier even when the tank is completely full of liquid.

4,885,881

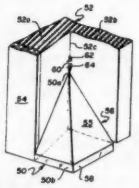
BOTTOM SEAL FOR L-PAD DOCK SHELTER

Kenneth Lenz, East Dubuque, Ill., assignor to Frommelt Industries, Inc., Dubuque, Iowa

Filed Mar. 3, 1989, Ser. No. 318,704

Int. Cl.[4] E04N *14/00*

U.S. Cl. 52—173 DS **16 Claims**



1. For use with a loading dock shelter including an L-pad attached to a wall for engaging an aft portion of a truck positioned adjacent to the loading dock, wherein a portion of the L-pad is in spaced relation from the wall so as to form a gap therebetween, a bottom seal comprising:

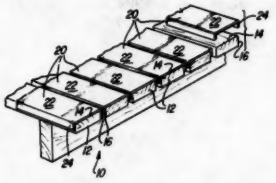
a compressible, resilient tapered pad having a generally flat base and an upper tapered portion forming an apex on said pad, wherein said base is positioned adjacent to and in contact with a lower edge of the L-pad and the wall adjacent thereto and fills the gap between the wall and the lower edge of the L-pad; and

means for attaching said tapered pad to an inner portion of the L-pad facing the wall so as to maintain said tapered pad in intimate contact with the wall and an inner portion of the L-pad so that said tapered pad fills the gap therebetween when the L-pad is engaged and deflected by a truck.

4,885,882
DECK COVERING

Gregory Forshee, 39138 Faith Dr., Sterling Heights, Mich. 48310

Filed Feb. 22, 1988, Ser. No. 158,842
Int. Cl.[4] E04F 11/16
U.S. Cl. 52—177 9 Claims



1. A cover for a board having a top and two sides comprising:

a one-piece generally U-shaped elongated channel member having a planar central section and two side sections,

said central section having a substantially flat top surface, a substantially flat bottom surface and dimensioned to overlie said top of said boards, said central section having two spaced apart and parallel sides and said side sections extending outwardly from said sides of said central section,

means for attaching said channel member to the board so that said bottom surface of said central section overlies and is closely adjacent the top surface of the board and so that each side section overlies and is closely adjacent at least a portion of its adjacent side of the board,

wherein the bottom surface of said central section includes a plurality of spaced apart and parallel slots,

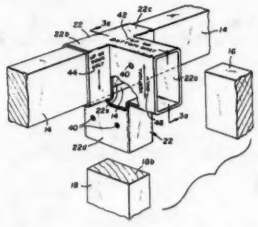
wherein said attaching means comprises means for glueing said channel member to the board so that said glue extends into said slots,

wherein the width of a midpoint of each slot is greater than the width of said slot at said bottom surface of said central section.

4,885,883
TWO-BY-FOUR CORNER MEMBERS

Robert L. Wright, 552 Glendale, Valparaiso, Ind. 46383

Continuation of Ser. No. 833,991, Feb. 27, 1986, abandoned.
This application Feb. 25, 1988, Ser. No. 163,187
Int. Cl.[4] E04B 1/38
U.S. Cl. 52—280 1 Claim

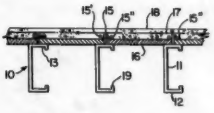


1. In combination, a connector member comprising a unitary body, said body including a first sleeve defining a vertically oriented opening, a first piece of lumber fitted in said first sleeve opening, said body further including a second sleeve defining a first horizontally oriented opening disposed at substantially a right angle to said first sleeve opening, a second piece of lumber fitted in said second sleeve opening, said body further including a third sleeve defining a second horizontally oriented opening disposed at substantially right angles to said second sleeve opening, a third piece of lumber fitted in said third sleeve opening, said body further including a wall part extending into said second sleeve opening adjacent said first and third sleeve openings, said wall part constituting means for preventing ingress of said second piece of lumber into either of said first or third sleeve opening, said first piece of lumber constituting means for supporting said second and third pieces of lumber in wood to wood contact when said pieces of lumber are fitted in their respective openings.

4,885,884
BUILDING PANEL ASSEMBLY

Herbert K. Schilger, 32 Castleglen Court N.E., Calgary, Alberta, Canada T3J 2B8

Continuation of Ser. No. 198,220, May 25, 1988, abandoned.
This application May 19, 1989, Ser. No. 355,861
Int. Cl.[4] E04B 5/52
U.S. Cl. 52—354 11 Claims

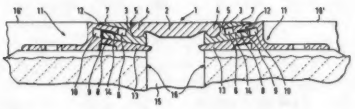


1. A panel for use as a building component comprising: (a) a plurality of C-shaped sheet steel channel beams each having a central web and an inner and outer edge flange, said inner flanges having cuts therein at longitudinally spaced locations to form upwardly projecting lugs, each said projecting lug having at least one lower flat part adjacent the inner flange and parallel to the central web and at least one upper part which includes at least one bendable part and at least one upwardly projecting anchoring part, and said beam members being parallel to each other and laterally spaced from each other; (b) formwork panel members resting on the outer faces of the inner flanges and extending between the beams, said framework panel member being held against said flanges by parts of said projecting lug bendable parts being bent around the edges thereof, with the upwardly projecting anchoring parts extending outwardly between adjacent framework panels and (c) a thin shell reinforced cementitious panel formed on said framework panels with said upwardly projecting anchoring parts being embedded in the cementitious material, thereby forming a reinforced building component.

4,885,885
JOINT BRIDGING DEVICE

Reinhard Gottschling, Essen, Fed. Rep. of Germany, assignor to Migua Hammerschmidt GmbH, Wulfrath, Fed. Rep. of Germany

Filed Mar. 6, 1989, Ser. No. 319,104
Claims priority, application Fed. Rep. of Germany, Mar. 31, 1988, 3811082
Int. Cl.[4] E04B 1/68; E01C 11/12; E04C 11/02
U.S. Cl. 52—396 11 Claims



1. A joint forming device for bridging a space between two generally co-planar surfaces comprising an elongate center

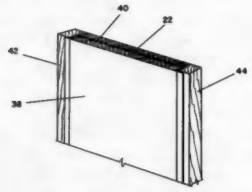
part generally rectangular in transverse section and having an upper generally horizontally disposed surface, the longitudinal side margins of said center part including part-cylindrical portions, a side part disposed adjacent each said side margin, said side parts including bearing shell means partially encompassing said part-cylindrical portions for pivotally connecting said side parts to said center parts, an anchoring unit outwardly adjacent each said side part, said anchoring units each including a pair of mutually spaced upper and lower cleats having opposed surfaces defining a slot opening toward a respective said side part, said slots being inclined at acute angles relative to said upper surface of said center part, said side parts each having an outwardly directed lower leg portion slidably received within a said slot of a respective said side part and an upper leg portion superposed over said upper cleat, said upper leg portion being generally wedge shaped in transverse section, said wedge shaped leg portion being of lesser cross section at positions progressively further from said center part.

4,885,886

NONSETTLING INSULATION STRUCTURE

Charles Rosso, Box 187, Cimarron, N. Mex. 87714

Filed Sep. 19, 1988, Ser. No. 246,635
Int. Cl.[4] E04B *2/00, 1/62*
U.S. Cl. 52—404 **8 Claims**



1. For use in a wall with a substantially vertical component, a nonsettling insulation structure comprising:

a support member comprising a sheet of semi-rigid permeable material having two sides and being easily cuttable;

a first layer of otherwise unsupported fibrous insulative material attached to one side of said sheet of semi-rigid permeable material;

a second layer of otherwise unsupported fibrous insulative material attached to the other side of said sheet of semi-rigid permeable material;

wherein said support member is capable of supporting and preventing settling of said first layer and said second layer of insulative material in the wall with the substantially vertical component;

wherein said support member comprises a generally rectangular sheet having a predetermined width and two longitudinal sides, said sides having thereon flange means for positioning and fastening said nonsettling insulation structure between parallel studs in the substantially vertical wall, and said flange means being positioned apart to approximate the width between such parallel studs; and

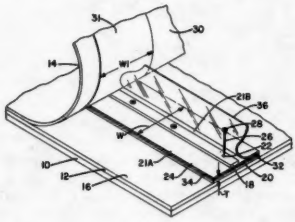
wherein said flange means comprise L-shaped cross sections, whereby said nonsettling insulation structure is affixable between the parallel studs at a preselected depth therebetween.

4,885,887

APPARATUS AND METHOD FOR SECURING AN OUTER ROOFING MEMBRANE TO AN INSULATED ROOF DECK

Robert W. Simmons, Federal Way, Wash.; Richard W. Stamper, Lambertville, Mich., and Thomas P. Kaufman, Toledo, Ohio, assignors to GenCorp Inc., Fairlawn, Ohio

Continuation of Ser. No. 191,949, May 9, 1988, abandoned. This application Jun. 1, 1989, Ser. No. 359,825
Int. Cl.[4] E04B *7/00, 5/00*
U.S. Cl. 52—410 **28 Claims**



1. A method of securing an EPDM rubber membrane to an insulated roof deck comprising the steps of:

laying a strip of EPDM rubber tape having successive coatings of an optional isocyanate primer, a butyl adhesive and a silicone release paper over said roof deck;

placing a bar anchor on said tape strip;

installing fasteners to secure said bar anchor and said tape strip to said roof;

removing said silicone release paper from said tape to expose said adhesive;

applying a strip of isocyanate primer to the bottom side of said membrane wherein said primer strip substantially overlies said adhesive on said tape; and

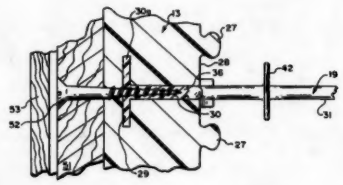
laying an outer membrane on said roof deck such that said strip of primer on said membrane contacts said adhesive on said tape and thereby bonds said membrane to said tape.

4,885,888

INSULATING NON-REMOVABLE TYPE CONCRETE WALL FORMING STRUCTURE AND DEVICE AND SYSTEM FOR ATTACHING WALL COVERINGS THERETO

David A. Young, Glen Ellyn, Ill., assignor to Young Rubber Company, Naperville, Ill.

Continuation-in-part of Ser. No. 799,933, Nov. 20, 1985. This application Nov. 16, 1987, Ser. No. 120,973
Int. Cl.[4] E04B *2/00*
U.S. Cl. 52—426 **9 Claims**



1. In a modular formed plastic concrete form structure, wherein the improvement comprises a pair of modular concrete forming panels each comprised of a series of modular concrete forming sections stacked on top of one another and

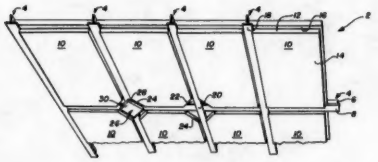
also disposed in end-to-end relation, the sections each having means on its upper and lower edges and its opposite vertical edges for interlocking the sections in stacked, end-to-end engagement with one another, the panels being positioned in spaced opposed relation, spaced T-shaped tie slots in the opposed sections and which slots are hidden from view when viewing outer surfaces of the stacked forming sections, tie located indicia on outer surfaces of the forming sections for providing blind sighting means to enable screws to be screwed through a wall covering, the indicia, the forming section and into the synthetic plastic ties to securely anchor an exterior wall finishing covering to the forming sections, synthetic plastic wall ties for use with concrete forms, the wall having a pair of T-shaped end sections including a tie stem having a sufficient thickness for receiving an end of a screw in threaded engagement therewith, the T-shaped end sections having parallel cross pieces at opposite ends of the tie secured to said modular concrete forming sections, the tie cross pieces having outer tie faces positioned generally at right angles to a plane through the length of the wall tie enabling said screw to be screwed through into the associated tie stem for attaching a wall covering thereto, the tie having an intermediate wall tie section, the intermediate wall tie section having a pair of transversely spaced round flange-like water-stops spaced in gap relation between the concrete forming sections extending radially outwardly out of the intermediate wall tie section and being joined therewith in integral one-piece assembly therewith, the water-stops serving to inhibit water flow axially of the wall tie and through a concrete wall structure where the tie is embedded, the round flange-like water-stops further serving to provide means for locating reinforcing rods extending at right angles to the wall ties when the wall ties are mounted in gap relation to the concrete forming sections in a concrete form.

4,885,889

GRID ACCENT AND CEILING BOARDS

John M. Hemphill, and Ernest B. Nute, Jr., both of Lancaster, Pa., assignors to Armstrong World Industries, Inc., Lancaster, Pa.

Continuation-in-part of Ser. No. 199,799, May 27, 1988, abandoned. This application Dec. 9, 1988, Ser. No. 281,635
Int. Cl.[4] E04B *5/55*
U.S. Cl. 52—484 **6 Claims**



1. A suspended ceiling system comprising:

(a) a network of ceiling runners formed in a geometric pattern, each runner being of a generally inverted T-shape with a vertical web and a horizontal flange extending to either side of the vertical web;

(b) a plurality of ceiling boards with edges and a finished surface, said boards being positioned and supported on their edges on the horizontal flanges of the ceiling runners, each edge of the board having a recessed groove means forming a surface to support the ceiling board on the runner with the finished surface of the board positioned below the horizontal flanges of the runners;

(c) the ceiling runners forming at least one intersection where four runners form a right angle intersection of the four runners;

(d) the improvement comprising:

(i) there being at least one intersection of the four runners, the four adjacent ceiling boards at the intersection being formed each with a cutaway area that has at least one edge and a bottom that is positioned generally in the plane of the horizontal flanges of the ceiling runners; and

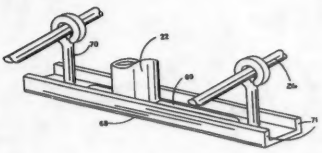
(ii) an insert having at least one edge and a finished surface positioned in said cutaway area of the four adjacent boards, said insert being generally smaller than said cutaway area so that said edge of said insert is spaced from said edges of the cutaway area, and said finished surface of the insert being substantially in the same plane as the finished surface of the ceiling boards.

4,885,890

MODULAR FURNACE LINING AND HARDWARE SYSTEM THEREFOR

Gary W. Deren, Tonowanda, N.Y., assignor to STEMCOR Corporation, Cleveland, Ohio

Division of Ser. No. 8,892, Jan. 30, 1987, Pat. No. 4,803,822. This application Nov. 7, 1988, Ser. No. 268,110
Int. Cl.[4] F23M *5/00;* **E04B** *1/62, 1/80*
U.S. Cl. 52—506 **2 Claims**



1. Attachment hardware adapted for mounting an insulation module on a surface, said module including a hot face adapted to be presented to the interior of a furnace and a cold face adapted to be presented to a surface of a furnace, the cold face and hot face defining between them a module thickness, a pair of side faces which between them define a module length and a top face and a bottom face which between them define a module width, said hardware comprising:

(a) a base bar adapted to extend along some portion of the module length and width, said base bar including a slot extending in the direction of the length of the base bar, said base bar being in the form of a channel shaped member having spaced apart sidewall members;

(b) a pair of tines depending from said base bar at spaced apart locations predetermined relative to the ends of the slot in the base bar toward the hot face, each said tine having an aperture therein adjacent its end distal from said base bar;

(c) an extension tube having an outside diameter complementary to the inside dimension between the sidewall members of the base bar, said tube being fitted into abutting relationship with the channel shaped member to contact the bottom central portion thereof over the slotted area, said extension tube projecting generally perpendicularly from the base bar toward the hot face;

(d) support rod means received in each said aperture of said tines, and adapted to extend longitudinally through at least some portion of the length of the module.

4,885,891

REINFORCEMENT MEMBER FOR AN EXTENDIBLE SCISSORS TRUSS

James P. Lynch, 13 South Field, Lakewood, Colo. 80226

Filed Aug. 30, 1988, Ser. No. 238,452
Int. Cl.[4] E04H *12/18*
U.S. Cl. 52—646 **22 Claims**

1. A reinforcement member for an extendible scissors truss, the truss having a plurality of truss members pivotally attached to one another to define a truss cell with a first pair of opposing

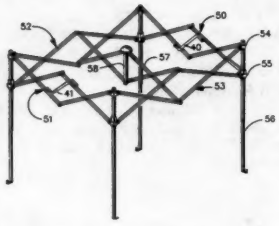
corners and a second pair of opposing corners said reinforcement member comprising:

first and second end portions, respectively; having a first and second distal end,

a first means for attaching said first end portion laterally adjacent to a first truss member;

a second means for attaching said second end portion laterally adjacent to a second truss member; and

a linking portion extending between said first and second end portions with a first end of said linking portion rigidly connected to said first end portion at a first connection



point spaced from said first distal end and a second end of said linking portion rigidly connected to said second end portion at a second connection point spaced from said second distal end in such a manner that, when said extendible scissors truss is in an extended configuration, said first connection point laterally abuts said first truss member and said second connection point laterally abuts said second truss member whereby said first and second end portions define first and second lever members which can exert a moment couple upon the first and second truss member.

4,885,892

COMPOSITE BEAMS

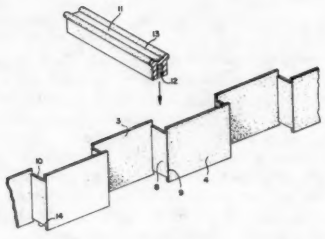
P. G. Gooding, 7 Kirrawee Road, North Gosford NSW 2250, Australia

Filed Jun. 16, 1988, Ser. No. 207,716

Claims priority, application Australia, Jun. 16, 1987, PI2520

Int. Cl.[4] E04C *3/07*

U.S. Cl. 52—690 **3 Claims**



1. A composite beam, comprising:

top and bottom plates, in mutual spaced, substantially parallel relationship;

a corrugated sheet extending between and affixed to said top and bottom plates, having corrugations including

a plurality of longitudinal surfaces, generally oriented parallel to the longitudinal axis of said top and bottom plates;

a plurality of transverse surfaces, generally oriented perpendicular to said longitudinal axis;

wherein edges of said transverse surfaces bear against adjacent surfaces of each of said plates and said longitudinal surfaces overlap and are affixed to said plates; and

a plurality of load spreading members, interposed betweens said transverse surface edges and said plates, each said member having a channel for receiving a said edge and a load bearing face with an area greater than the area of said edge, said load bearing face being positioned in contact with a said plate.

4,885,893

WELL MAST STRUCTURE

Philip W. Wasterval, Jr., and James E. Armstrong, both of Houston, Tex., assignors to IMI Engineering, Co., Houston, Tex.

Filed Sep. 10, 1987, Ser. No. 94,867

Int. Cl.[4] E04H *12/34;* **B66C** *23/34*

U.S. Cl. 52—745 **11 Claims**

1. A method of raising a well mast at a well site, comprising the steps of:

attaching a lower mast section having an upper end and a lower end to a well platform;

positioning the lower mast section in a fixed substantially vertical position on the well platform;

grasping a second mast section having an upper end and a lower end at a lifting position intermediate said ends of said second mast section;

moving the second mast section to a location near the upper end of the lower mast section;

maintaining the second mast section substantially horizontal during said steps of grasping and moving;

connecting the second mast section at a connector position intermediate said ends of said second mast section to the upper end of the lower mast section; and

rotating the second mast section to a position within the lower mast section.

4,885,894

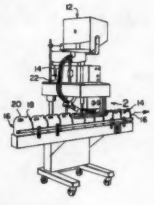
CAP ALTERNATOR

Kenneth J. Herzog, 200 Mill Rd., Riverhead, N.Y. 11901

Filed Jan. 19, 1988, Ser. No. 145,380

Int. Cl.[4] B65B *57/02, 7/28*

U.S. Cl. 53—68 **4 Claims**



1. A cap alternator feed device for a capper machine that feeds caps to longitudinally spaced containers in which each container has a forward neck to be capped, a side and a longitudinally spaced rearward raised portion not lower than the neck, said device comprising a track for overhead feeding of the caps to the neck in combination with means for preventing deposition of a cap on said raised portion, wherein, said means is responsive to engagement with said container side at a point between said neck and said raised portion, wherein said preventing means includes a trigger forward of said raised portion and a restrainer which is activated by said trigger responsive to contact with said side of the container to engage the cap on said track preventing deposition of the cap on said raised portion, wherein said restrainer includes:

(a) a block affixed to one side of said track;

(b) a bracket pivotly mounted to said block;

(c) a tilting restrainer finger affixed to top of said bracket so that said finer can extend over said track; and

(d) a compression spring disposed between said block and said bracket to normally keep said bracket in a vertical non operative position.

4,885,895

PROCESS AND APPARATUS FOR FEEDING BLANKS TO A FOLDING UNIT

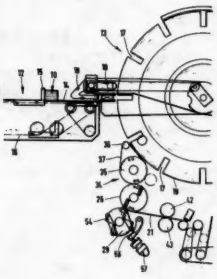
Heinz Focke, Verden, and Jurgen Wach, Bremen, both of Fed. Rep. of Germany, assignors to Focke & Co. (GmbH & Co.), Verden, Fed. Rep. of Germany

Filed May 27, 1988, Ser. No. 204,138

Claims priority, application Fed. Rep. of Germany, Jun. 30, 1987, 3721459

Int. Cl.[4] B65B *57/12*

U.S. Cl. 53—73 **15 Claims**



1. Process for the feeding blanks of packaging material to a folding turret, for the wrapping of articles or groups of articles, the blanks being severed from a continuous web of material by severing knives of rotating knife rollers and being delivered to the folding turret or to a conveyor roller preceding the latter, said process comprising controlling the feed of the blanks (11) to the folding turret (13) as a function of the feed of articles (10) to be packaged, in such a way that, when there is an interruption in the feed of articles (10), the transfer of blanks (11) to the folding turret (13) is interrupted until articles (10) are fed to the folding turret (13) once again.

4,885,896

APPARATUS FOR COLLATING DUAL-USE FILTER SACHETS ARRANGED IN THE NON-CONSUMER MODE IN MACHINES FOR THE CONTINUOUS PRODUCTION OF SAID FILTER SACHETS

Andrea Romagnoli, San Lazzaro Di Savena, Italy, assignor to Cestind - Centro Studi Industriali - S.r.l., San Pietro Terme, Italy

Filed Feb. 10, 1988, Ser. No. 154,650

Claims priority, application Italy, Mar. 9, 1987, 3380 A/87

Int. Cl.[4] B65B *29/04*

U.S. Cl. 53—116 **4 Claims**

1. An apparatus for making infusion packets comprising:

means for feeding a strip of thermally weldable filter paper along a transport path;

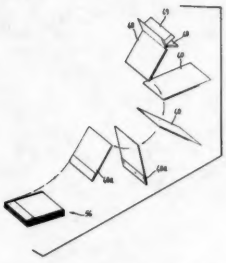
means along said path for feeding successive measured quantities of an infusion product onto said strip;

means along said path for folding said strip into a flattened tube, formed with separating and folding transverse thermal welds alternating with one another and each having a transverse median line, said transverse welds flanking said quantities of said infusion product on said strip, and defining individual bags each containing a measured quantity of said infusion product;

means along said path for applying labels, tabs and strings to said strip;

means for severing segments of said strip from one another along the separating transverse welds to form respective segments each comprising at least two of said bags joined by the respective folding weld, each of said segments being formed with a respective leading extremity and a respective trailing extremity;

folding means downstream of said path for forming bellows-shape portions of the respective segments along the respective folding transverse weld thereof;



conveying pincer means for seizing said bellows-shape portions and for conveying said segment further along the path;

stationary folding means provided with a funnel for bringing bags of the respective segment toward each other, so that said bags of the respective segment are folded against opposite sides of said bellows-shape portion with said leading and trailing extremities adjacent to each other, and

welding means for receiving said segments with folded bags and for welding together said adjacent leading and trailing extremities.

4,885,897

METHOD OF MAKING HERMETICALLY SEALED CONTAINER

Toshio Gryouda; Shouichi Inaba; Michio Watanabe, and Kanemichi Yamaguchi, all of Yokohama, Japan, assignors to Toyo Seikan Kaisha, Limited, Tokyo, Japan

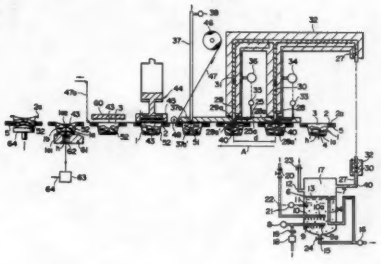
PCT No. PCT/JP88/00025, § 371 Date Sep. 13, 1988, § 102(e) Date Sep. 13, 1988, PCT Pub. No. WO88/05402, PCT Pub. Date Jul. 28, 1988

PCT Filed Jan. 13, 1988, Ser. No. 255,200

Claims priority, application Japan, Jan. 16, 1987, 62-8599; Jun. 25, 1987, 62-158577; Aug. 28, 1987, 62-214746

Int. Cl.[4] B65B *31/02*

U.S. Cl. 53—407 **6 Claims**



1. A method of making a hermetically sealed container (52) comprising the steps of:

blowing a water vapor (40) generated by blowing a non-con-

densable gas with a constant flow rate into a water (13) which is controlled to a constant temperature, into a container body (1) which has been placed with a produce (4) leaving a space portion (3); and immediately thereafter, hermetically sealing said container body with a lid (43).

4,885,898

APPARATUS FOR PROCESSING CUT FLOWERS OR SIMILAR ARTICLES

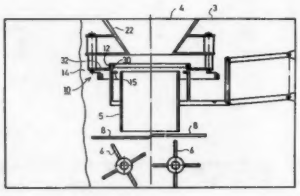
Boris Khurgin, Haifa, Israel, assignor to Devis Ltd., Haifa, Israel

Filed Mar. 31, 1988, Ser. No. 175,793

Claims priority, application Israel, Apr. 10, 1987, 82159; Mar. 14, 1988, 85732

Int. Cl.[4] B65B *13/02*

U.S. Cl. 53—513 16 Claims



1. Apparatus for processing cut flowers or similar articles, comprising: a stand formed with an opening for receiving the stems of a bunch of the cut flowers or other articles; an elastic band holder underlying the opening and comprising a plurality of fingers; a first plurality of pins located in a circular array about a central axis coaxial with said opening in the stand, and each mounting one end of one of said fingers, the opposite ends of said fingers having a projection receiving an elastic band; a circular ring carrying a second plurality of pins arranged in a circular array; a link coupling each of said second plurality of pines to one of said first plurality of pins; an actuator coupled to said circular ring for displacing it laterally with respect to the axis of said opening so as to pivot said fingers first to a closed position for receiving the elastic band, and then to an open position for stretching the elastic band to enclose the bunch of stems received through the opening in the stand; and a stripper member for stripping the elastic band from the holder onto the stems inserted through the opening.

4,885,899

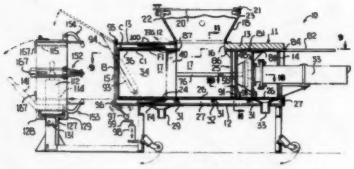
COMPACTING MACHINE

Roy E. Hutchinson, 40 McKay Road, Dundas, Ontario, Canada L9H 1H7

Filed Jan. 21, 1980, Ser. No. 114,127

Int. Cl.[4] B65B *1/24, 7/20*

U.S. Cl. 53—527 13 Claims



1. A compacting machine for compacting material in a carton having closure flaps comprising a housing defining a generally elongated compacting chamber, means movable along a first path of travel for compacting material within a carton housed within said compacting chamber with flaps of the carton being folded externally of the carton, means movable along a second path of travel generally coincident with and in the same direction as said first path of travel for discharging and further moving the carton from the compacting chamber, means for folding the carton flaps to a closed position after the discharge of the carton and during its further movement along the second path of travel from the compacting chamber by said discharging means, said support means being disposed for receiving each carton discharged from the compacting chamber, said folding means including a plurality of fingers pivotally carried by said support means with each finger being located to contact an associated flap as the carton is received upon said support means, and means slidably carried by said support means and contactable by a closed end of the carton during the receipt of the carton upon the support means for pivoting each finger from a position externally of the carton and adjacent a peripheral wall thereof to a position overlying an end of the carton.

4,885,900

DRIVING METHOD AND SYSTEM FOR CONTROLLING A TUBULAR-BAG MACHINE

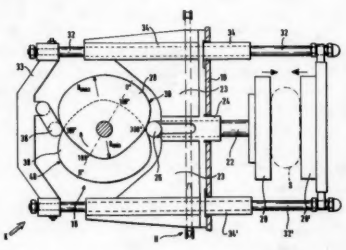
Herbert Lohr; Bernd Stein, both of Reiskirchen; Helmut Becker, Pohlheim; Reiner Ade, Bad Nauheim, and Walter Baur, Gruendau, all of Fed. Rep. of Germany, assignors to Rovema Verpackungsmaschinen GmbH, Fernwald-Annerod, Fed. Rep. of Germany

Filed May 11, 1988, Ser. No. 192,805

Claims priority, application Fed. Rep. of Germany, May 12, 1987, 3715838

Int. Cl.[4] B65B *9/08, 51/30, 51/14*

U.S. Cl. 53—551 9 Claims

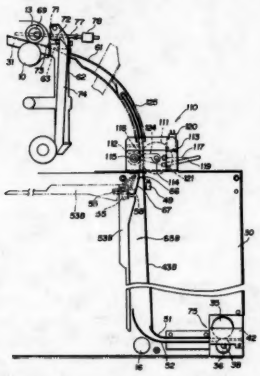


1. In a drive system for controlling the operation of a form-/fill/seal machine, including a computer control device for producing control signals, means for intermittently advancing a thin foil, forming it into a tube shape and guiding it vertically between heated sealing jaws that act transversely to the direction of movement of said foil, whereby a tubular bag closed at its bottom is formed and is adapted to be filled with a packing material through a fill pipe, said sealing jaws being equipped with motive means including push rods connected to two separate but cooperating drive means controlled by said computer control device for effecting the movement of the foil on the one hand and the sealing jaws on the other hand, the improvement wherein said motive means includes at least two cam follower rollers connected to and movable with said push rods, and wherein controlling means are provided for independently controlling each of said drive means such that its angular speed is, at any time during a work cycle, independent from a preceding or following angular speed stage, said controlling means comprising a cam package with at least two contoured control cams coupled to a common drive shaft, said at least two control cams being contour-engaged by said cam following rollers for effecting an opening and closing of the sealing jaws in directions opposite to each other.

4,885,901
BAND LOADING APPARATUS IN A PACKAGING MACHINE

Yasunori Sakaki, Tokyo, and Tsutomu Tagomori, Yokohama, both of Japan, assignors to Strapack Corporation, Tokyo, Japan

Division of Ser. No. 127,290, Dec. 1, 1987, Pat. No. 4,845,928.
This application Sep. 21, 1988, Ser. No. 247,356
Claims priority, application Japan, Jul. 8, 1987, 62-103876
Int. Cl.[4] B65B *13/04*
U.S. Cl. 53—589 6 Claims



1. In a strapping machine for applying a band around an object, comprising a pool box for storing a section of band, said pool box having a band outlet, a pair of motor-driven feed rollers for feeding the band from the pool box, and guide chute means defining a guide path extending between the band outlet and said feed rollers for guiding said band, the improvement comprising band-loading means for pre-feeding the band from said pool box to said motor-driven feed rollers, said band-loading means comprising:

a pre-feeding roller pair including:

a traveling roller disposed on one side of said guide path adjacent said band outlet, and

a rotatable pre-feed roller disposed opposite said traveling roller on an opposite side of said guide path, said pre-feed roller including a circular periphery interrupted by a notch, said circular periphery being operable to press a band against said traveling roller when said circular periphery is situated opposite said traveling roller, said notch forming a clearance with said traveling roller to permit a band to move freely therepast when said notch is situated opposite said traveling roller, said pre-feed roller being yieldably biased to a rest position wherein said notch is situated opposite said traveling roller,

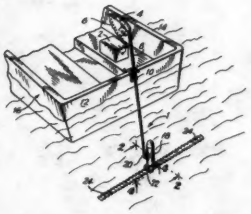
means for rotating said pre-feeding roller pair to pre-feed a band from said pool box to said motor-driven feed rollers as said circular periphery passes opposite said traveling roller, and sensing means for sensing rotation of said pre-feeding roller pair and energizing said motor-driven feed rollers for a predetermined time period in response to sensing rotation of said pre-feeding roller pair.

4,885,902
AQUATIC VEGETATION HARVESTER

Michael Schmidt, 51 Tamarack Rd., Mahopac, N.Y. 10541

Filed Apr. 13, 1988, Ser. No. 181,323
Int. Cl.[4] A01D *45/08*
U.S. Cl. 56—8 17 Claims

1. A light weight, portable aquatic vegetation harvester which comprises a direct current electrical motor for generating a driving force, two reciprocating type cutting blade assemblies disposed in a substantially opposed relationship relative to each other, means for transmitting the driving force of said motor to said blade assemblies, and means for reversing the polarity of the direct current to said motor, means for

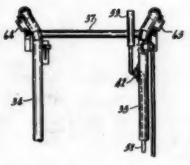


preventing the intrusion of water to preselected parts of the aquatic vegetation harvester, and a switch which upon the occurrence of a preselected operating condition prevents electrical power from being conducted to said direct current electrical motor.

4,885,903
SAFETY INTERLOCK FOR LAWN MOWERS

Dane T. Scag, Box 152, Mayville, Wis. 53050

Filed Jul. 27, 1988, Ser. No. 224,925
Int. Cl.[4] A01D *69/00*
U.S. Cl. 56—10.8 5 Claims



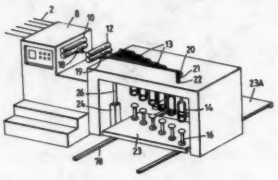
1. In a lawn mower having an engine for driving a cutter blade and drive wheels, first and second clutch means for coupling and disengaging said cutter blade and drive wheels, respectively, to and from said engine, safety interlock means operable in a first position to maintain the engine in operation and in a second position to deactivate said engine when said cutter blade or drive wheels are coupled to the engine, a pair of spaced apart, generally elongate, individual handles mounted on said lawn mower and extending generally rearwardly and each having a surface adapted to be gripped by an operator for manipulating the lawn mower, each surface including an inner surface portion facing generally toward the other handle, an outer surface portion on the opposite side thereof and an upper surface portion, the improvement wherein the safety interlock means includes at least one lever pivotally mounted adjacent at least one of said handles for pivotal movement between said first and second positions and movable therewith, said hand grip being disposed, adjacent to the outer surface portion of the one handler and spaced from the upper surface portion thereof when said lever is in its first position, whereby said handle grip will fit comfortably in the palm of the operator's hand without stain as the hand grip means is maintained in its first position by the operator gripping the one handle.

4,885,904

DRAWING MACHINES

Robert J. Hunt, Lisburn, and Kenneth F. Crockard, Bangor, both of Northern Ireland, assignors to James Mackie & Sons Limited, Belfast, Northern Ireland

Filed Sep. 16, 1988, Ser. No. 245,277
Claims priority, application United Kingdom, Sep. 18, 1987, 8722062
Int. Cl.[4] D01H 7/24, 7/40
U.S. Cl. 57—67 10 Claims



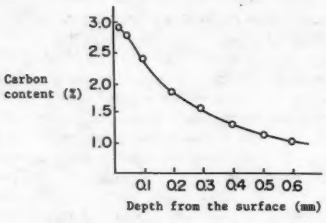
1. A drawing machine comprising:
drawing means for drawing a plurality of slivers;
a plurality of flyers positioned downstream of the drawing means for positioning the slivers for winding;
guide means for establishing a path for the slivers from the drawing means to the flyers; and
mounting means for mounting the flyers in an array spaced longitudinally along the sliver path.

4,885,905

RING FOR SPINNING MACHINERY

Akira Maruta, and Ryouichi Motoyama, both of Amagasaki, Japan, assignors to Kanai Juyo Kogyo Co., Ltd., Hyogo, Japan

Filed Oct. 17, 1988, Ser. No. 258,612
Claims priority, application Japan, Dec. 28, 1987, 62-333740
Int. Cl.[4] D01H 7/60
U.S. Cl. 57—119 11 Claims



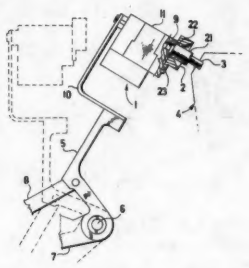
1. A ring for spinning machinery, said ring made of alloy steel containing 0.9–26% Cr, and said alloy steel of said ring having, at least at a surface for receiving a traveller sliding thereagainst, a surface layer in which swollen and diffused carbide occupies 30–90% of the area of said surface layer, with a surface roughness of less than Ra 0.25 micrometers in average roughness at a center line and a 1.5–5% carbon content.

4,885,906

DEVICE FOR AUTOMATICALLY SPINNING-IN YARN

Frantisek Burysek, Ústí bad Orlicí, and Pavel Andrlík, Liberec, both of Czechoslovakia, assignors to Vyzkumny ustav bavlnarsky, Ústí nad Orlicí, Czechoslovakia

Filed Sep. 23, 1988, Ser. No. 249,486
Claims priority, application Czechoslovakia, Sep. 23, 1987, PV 6812-87
Int. Cl.[4] D01H 15/02, 13/04
U.S. Cl. 57—263 4 Claims



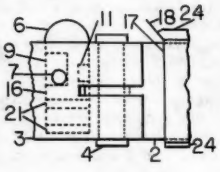
1. A device for automatically spinning-in yarn into a take-off tube of a spinning unit of especially an open-end rotor spinning machines, the device being adapted for travelling along the machine and comprising,
a spinning-in head having a spinning-in conduit and a lead-on cone for leading said conduit onto said take-off tube,
a swing lever, said head being attached to the swing lever, and
gearing means coupled with said swing lever for swinging said swing lever toward and away from said take-off tube,
the spinning-in head being attached to the swing lever by attaching means kinematically firmly in a first plane of its swing motion but resiliently in a direction perpendicular to said first plane, thereby allowing the spinning-in head to move across a mouth of said take-off tube while being led by said lead-on cone.

4,885,907

CHAINBAR

Sofia Pappanikolaou, 621 90th St., Brooklyn, N.Y. 11228

Filed Nov. 25, 1988, Ser. No. 276,131
Int. Cl.[4] F16G 13/18
U.S. Cl. 59—78 6 Claims



1. A chain bar of adjustable rigid length, comprising at least first and second links; means for hinging said first link to said second link; said means for hinging being operable for permitting said hinging to occur about an axis; mechanical means in said first link, immediately movable upon activation, from a first position into a second position and from said second position into said first position, so that in said first position, said mechanical means locking said first and second links in at least one fixed angle relative to the other about said axis; and in said

second position, unlocking said first and second links and allowing free rotation therebetween; whereby said mechanical means further includes a sliding bolt which when in said first position, meshes with an indentation in said second link; and when in said second position, is free of said indentation.

4,885,908

ENERGY-CONDUCTING CHAIN MADE FROM PLASTICS MATERIAL

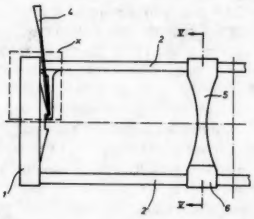
Albert Stöhr, Am Wiegenberg 8, 8015 Markt Schwaben, Fed. Rep. of Germany

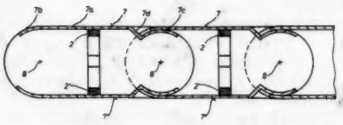
Filed Jul. 8, 1988, Ser. No. 222,065

Claims priority, application Fed. Rep. of Germany, Jul. 15, 1987, 3723362

Int. Cl.[4] F16G *13/16*

U.S. Cl. 59—78.1 **11 Claims**





1. An energy conducting chain comprising:

first and second spaced side plate chains, each of said chains comprising a plurality of pairs of side plates pivotally connected in series and substantially parallel to each other said side plates including upper, lower, inside, and outside surfaces, at least some of the side plates of said first and second chains defining recesses in said upper and lower surfaces;

pairs of cross-piece members extending laterally between said first and second side plate chains at intervals along the lengths of said side plate chains;

locking member integrally formed at opposite ends of each of said cross-piece members and each locking member including an extension for mating with the recess of a side plate of said side plate chains,

a spring biased stop tongue attached to opposite ends of said cross-piece members and located inwardly of said locking members, each stop tongue including a free end with a stop projection thereon, said stop tongues being spring biased in direction parallel to the longitudinall extent of its respective cross-piece member;

each of said side plates including, on the inside surface thereof, an inclined guide surface which terminates in a stop surface adapted to be engaged by said stop projection and form with said stop tongue a releasable snap connection between said cross-piece member and said side plate chain;

and an opening formed in each end of said cross-piece members, each opening in registration with said spring biased stop tongue, said opening oriented to permit an elongated tool to be inserted longitudinally into said opening and urged against said spring biased stop tongue and move said stop projection out of engagement with said stop surface.

4,885,909

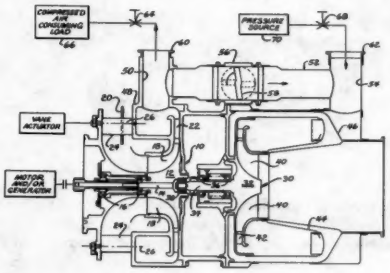
METHOD OF OPERATING A MULTIPURPOSE AUXILIARY POWER UNIT

Colin Rodgers, San Diego, Calif., assignor to Sundstrand Corporation, Rockford, Ill.

Division of Ser. No. 92,408, Sep. 2, 1987, abandoned. This application Nov. 14, 1988, Ser. No. 271,516

Int. Cl.[4] F02C *7/268*

U.S. Cl. 60—39.02 **2 Claims**



1. A method of operating a gas turbine alternatively as an auxiliary power unit, a load compressor, and air turbine starter or the like, the turbine including a centrifugal compressor and a rotary turbine wheel together with a clutch interconnecting the compressor and the turbine wheel and selectively operable to couple or decouple the compressor, variable inlet guide vanes for the compressor, and a combustor for providing hot gas to the turbine, said method comprising the steps of:

(a) operating the gas turbine as an auxiliary power unit by driving the compressor by the turbine wheel while coupling a rotary machine to be driven to one of the compressor and the turbine wheel;

(b) operating the gas turbine as a load compressor by driving the compressor with the same decoupled from the turbine wheel by the clutch and diverting air compressed by the compressor from the combustor to an external load consuming compressed air; and

(c) operating the turbine wheel as an air turbine starter for the gas turbine by directing compressed gas from an external source to the combustor while initially closing the inlet guide vanes to the compressor and coupling the compressor to the turbine wheel by the clutch, and thereafter opening said inlet guide vanes.

4,885,910

TANDEM MASTER CYLINDER FOR A HYDRAULIC DUAL-CIRCUIT BRAKE SYSTEM OF A ROAD VEHICLE

Reinhard Resch, Stuttgart, Fed. Rep. of Germany, assignor to Daimler-Benz Aktiengesellschaft, Stuttgart, Fed. Rep. of Germany

Filed Aug. 4, 1988, Ser. No. 228,105

Claims priority, application Fed. Rep. of Germany, Aug. 4, 1987, 3725791

Int. Cl.[4] B60T *11/20*

U.S. Cl. 60—562 **10 Claims**

7. Tandem master cylinder arrangement for a hydraulic dual-circuit brake system for a vehicle, comprising:

cylinder housing means defining longitudinally extending cylinder bore means,

a primary piston slidably guided in the cylinder bore means and being operable to control brake fluid pressure in a primary brake circuit,

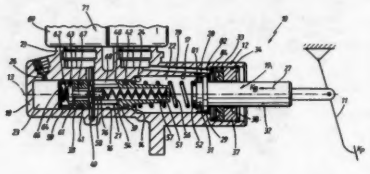
a secondary piston slidably guided in the cylinder bore

means in axial alignment with the primary piston, said secondary piston being a floating piston which is actuably movable in response to movement of the primary piston and which is operable to control brake fluid pressure in a secondary brake circuit,

first restoring spring means interposed between the primary and secondary pistons,

second restoring spring means interposed between the cylinder housing means and the secondary piston, and

stop means extending into the travel path of the secondary piston and serving to limit movement of the secondary piston with respect to the cylinder housing means,



wherein said secondary piston includes a central supporting projection facing the primary piston, said first restoring spring means surrounding the central supporting projection with said central supporting projection having an axial extent corresponding to the fully compressed block length of the first restoring spring means,

wherein said secondary piston is provided with a central blind bore extending over a predominate part of the length of the central supporting projection,

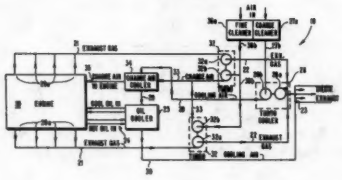
and wherein said second restoring spring means is disposed in said central blind bore and extends over substantially the full axial length of the first restoring spring means when said first and second restoring spring means are in their respective fully compressed block length.

4,885,911

INTERNAL COMBUSTION ENGINE TURBOSYSTEM AND METHOD

William E. Woollenweber, 3169 Camino del Arco, La Costa, Calif. 92009-7856, and Niels J. Beck, 4073 The Hill Rd., Bonita, Calif. 92109

Filed Feb. 24, 1988, Ser. No. 159,840
Int. Cl.[4] F01P *5/08*
U.S. Cl. 60—597 **33 Claims**



1. An oil-only, internal combustion engine system with an exhaust-driven, cooling system, comprising:

a multi-cylinder, internal, combustion-engine assembly;

means for providing a mixture of fuel and air to the internal combustion engine assembly;

means for carrying the product of the combusted fuel-air mixture from the internal combustion engine assembly;

means for providing a flow of lubricant to and from the internal combustion engine assembly for lubricating the internal combustion engine assembly and for carrying heat generated by operation of the internal combustion engine assembly away from the internal combustion engine assembly;

an oil cooler, connected with said means for providing a flow of lubricant, to dissipate the heat carried by said lubricant from the internal combustion engine assembly prior to its return to the internal combustion engine assembly;

a turbocooler having a turbine connected with the means to carry the product of the combusted fuel-air mixture from the internal combustion engine assembly so that the exhaust gas carried from the internal combustion engine assembly by said exhaust means drives the turbine of the turbocooler, said turbocooler also having a ducted fan means driven by the turbine of the turbocooler, said ducted fan means communicating with atmosphere and generating a ducted flow of cooling air;

means for directing the flow of cooling air generated by the fan means of said turbocooler through the oil cooler to cool the lubricant and dissipate the heat generated in operation of the internal combustion engine assembly; and

means for directing the cooling air generated by said turbocooler from said oil cooler to said means for carrying the product of the combusted fuel-air mixture from said internal combustion engine assembly, said means for directing the cooling air including a portion forming a cooling air inlet surrounding said means for carrying the combusted fuel-air product prior to its leaving the exhaust-carrying means, thereby substantially reducing both the temperature and the pressure of the internal combustion engine exhaust.

4,885,912

COMPRESSED AIR TURBOMACHINERY CYCLE WITH REHEAT AND HIGH PRESSURE AIR PREHEATING IN RECUPERATOR

Michael Nakhamkin, Mountainside, N.J., assignor to Gibbs & Hill, Inc., New York, N.Y.

Filed May 13, 1987, Ser. No. 49,870
Int. Cl.[4] F02C *6/16, 9/00*
U.S. Cl. 60—652 **26 Claims**

1. In a power plant of the type which produces compressed air by use of excess energy generated during off-peak load periods and accumulates said compressed air in an air storage device, the stored compressed air being withdrawn from said storage device and delivered to an expansion train during peak load periods for generation of peaking energy, said expansion train comprising a high pressure turbine and a low pressure turbine, a method of operating said expansion train comprising the steps of:

heating in a recuperator compressed air from said storage device;

providing heated air from recuperator directly to said high pressure turbine and using said heated air to drive said high pressure turbine without combustion thereof;

supplying exhaust air from said high pressure turbine to a combustion chamber for combustion thereof to produce a resulting gas;

supplying said resulting gas to an input of said low pressure turbine;

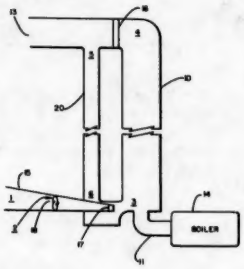
modifying said low pressure turbine so as to decrease its expansion ratio while maintaining an essentially constant overall expansion ratio of said expansion train, whereby the temperature of its exhaust gas is increased; and

supplying said exhaust gas from said low pressure turbine to said recuperator for heat exchange with said compressed air from said air storage device, the temperature of said exhaust gas from said low pressure turbine being sufficiently high that heat exchange with said compressed air raises the temperature of said compressed air enough to eliminate the need for combustion of said compressed air in a high pressure combustor.

4,885,913
OPEN CYCLE LATENT HEAT ENGINE

Julius Czaja, 229 Village Blvd. S., Baldwinsville, N.Y. 13027

Filed Aug. 15, 1988, Ser. No. 231,898
Int. Cl.[4] F01K *25/06*
U.S. Cl. 60—673 4 Claims



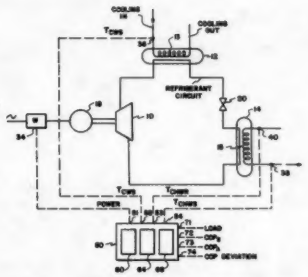
1. An open cycle latent heat engine comprising:
a. an elevator passageway having an entrance at a lower level and an exit at a higher level having a substantially higher elevation than said lower level;
b. means for inputting warm water vapor into said lower level of said elevator passageway to produce a wet adiabatic expansion of moist air rising in said passageway;
c. a condensate remover in the region of said exit from said elevator, said condensate remover being arranged for removing water condensed from said vapor at said higher elevation of said exit;
d. a compressor passageway descending from the region of said elevator passageway exit to the region of said elevator passageway entrance, said compressor passageway being arranged for receiving a portion of the air discharged from said elevator exit for adiabatically and gravitationally compressing dry air descending in said compressor passageway;
e. an ejector arranged at a lower region of said compressor passageway;
f. said ejector having a nozzle receiving ambient atmosphere flowing through said nozzle and directed into said entrance of said elevator passageway, said dry air compressed in said compressor passageway having a subatmospheric pressure at said lower region of said compressor passageway and being drawn into said ejector to help sustain the flow of ambient atmosphere through said ejector nozzle, the combined flow of ambient and compressor passageway air from said ejector being directed into said entrance of said elevator passageway, to rise in said elevator passageway; and
g. means for extracting energy from the air circulation flow established by said elevator passageway, said compressor passageway, and said ejector.

4,885,914
COEFFICIENT OF PERFORMANCE DEVIATION METER FOR VAPOR COMPRESSION TYPE REFRIGERATION SYSTEMS

Arthur N. J. Pearman, St. Paul, Minn., assignor to Honeywell Inc., Minneapolis, Minn.

Continuation of Ser. No. 104,691, Oct. 5, 1987, abandoned. This application Feb. 14, 1989, Ser. No. 315,238
Int. Cl.[4] G01K *13/00*
U.S. Cl. 62—129 1 Claim

1. A meter for determining the deviation of the actual coefficient of performance value (COPa) relative to the optimum coefficient of performance value (COPs) of a vapor compression type refrigeration system having components including power supply and power measuring means, condenser water supply and return lines and evaporator chilled water supply and return lines, said meter comprising, a chassis, input terminal means on said chassis for receiving input data from said components, a first temperature sensor electrically connected to said input terminal means and being connectable to said condenser water supply line, a second temperature sensor electrically connected to said input terminal means and being connectable to said evaporator chilled water supply line, means connecting said power measuring means to said input terminal means, data means for said meter including a plurality of sets of manufacturer's performance data for a corresponding plurality of vapor compression systems, said set of perfor-



mance data being for the power used versus the cooling effect at various condenser water supply temperature (Tcws) and various evaporator chilled water supply temperatures (Tchws), data storage means for said meter in the form of loop-up-tables for said sets of performance data in respective ROM chips which are selectively connectable to said meter, computing means for said meter, program storage means for said meter for storing a program for calculating specific coefficients of performance (COPs) based on said manufacturer's performance data for ordered pair of values of said Tcws and said Tchws read from said input terminal means, and output terminal display means on said chassis for displaying said COPa and said COPs.

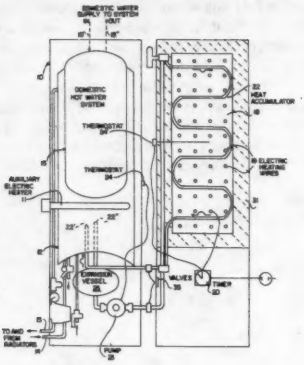
4,885,915
HEAT ACCUMULATOR

Leif Jakobsson, Vindon 8736, Henn, Sweden 44090

Continuation of Ser. No. 626,858, Jun. 27, 1984, Pat. No. 4,714,821. This application Jul. 27, 1987, Ser. No. 79,701
Claims priority, application Sweden, Oct. 29, 1982, 82061557
Int. Cl.[4] F25B *27/00*
U.S. Cl. 62—238.6 16 Claims

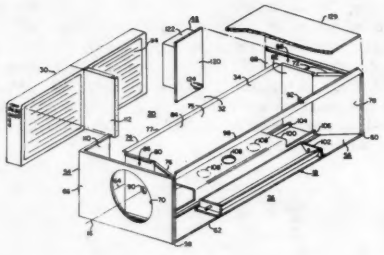
1. A heat exchanger system, comprising:
a heat accumulator having a body of a ceramic material of high heat capacity and high melting point;
a cooling/heating machine for serving an accomodation;
means for heating said body to a temperature close to said

melting point and considerably higher than the temperature within the accomodation; and



means for placing said body in heat exchange relation with said cooling/heating machine for supplying heat thereto.

4,885,916
BUS AIR CONDITIONING UNIT
Warren D. Arndt, Roseville, Minn., assignor to Thermo King Corporation, Minneapolis, Minn.
Filed Feb. 16, 1989, Ser. No. 311,508
Int. Cl.[4] B60H *1/32*
U.S. Cl. 62—244 **11 Claims**



1. A bus air conditioning unit suitable for roof mounting adjacent either the front or rear of a bus, comprising:

an elongated metallic frame having a base which includes first and second axial ends, and first and second sides which extend between said first and second axial ends,

said frame further including first and second upstanding end members, fixed to the first and second axial ends, respectively, of said base, and an upstanding bulkhead fixed to said base,

said up standing bulkhead dividing said base into evaporator and condenser plenums, with said bulkhead having first and second sides which respectively face said evaporator and condenser plenums,

said upstanding bulkhead having first, second, third, fourth and fifth portions, with said first and second portions angling outwardly from the first and second upstanding end members, respectively, starting at the first side of the base, said first and second portions respectively joining said third and fourth portions which are disposed in spaced parallel relation with the first and second upstanding end members, respectively, to define condenser fan pockets on the second side of the bulkhead, adjacent to the first and second axial ends of the base,

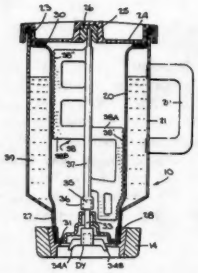
said fifth portion interconnecting the third and fourth portions,

a condenser,

and a control panel,

said condenser and control panel extending serially along the second side of the base, and forming structural elements of the frame.

4,885,917
HOUSEHOLD APPLIANCE FOR MAKING FROZEN FOOD PRODUCTS
Donald Spector, 380 Mountain Rd., Union City, N.J. 07087
Filed Oct. 20, 1986, Ser. No. 920,669
Int. Cl.[4] A23G *9/12*
U.S. Cl. 62—343 **5 Claims**



1. An appliance for making frozen or chilled food and beverage products, motive power therefor being supplied by the existing electric power base unit of a standard household blender having a conventional removable bowl incapable of making said products, which unit includes a case having a platform and motor whose shaft extends upwardly through the platform and terminates in a drive coupler, the platform having a socket or cage thereon adapted to accommodate the removable bowl of the blender, said appliance comprising:

a removable bowl assembly to be used in place of said removable bowl and adapted to make said products, said assembly being formed by an inner cannister for containing ingredients and having a bottom section embraced by a ring adapted to be received in said socket, and a double-walled jacket surrounding the cannister above the bottom section, said bowl assembly being formed by said inner cannister and an outer shell so shaped as to define therewith said double-walled jacket and said bottom section, said jacket being sealed and having a cavity therein containing a freezable agent constituted by a gel having a high heat capacity which is sealed within the jacket, whereby when the bowl assembly is stored in a freezer, said sealed agent is frozen, and when said assembly is placed on the platform of the unit, the jacket then functions as a frozen body heat transfer relation with respect to the ingredients contained in the cannister;

B a short axle supported for rotation on a bottom wall of the bottom section, said axle extending through the wall into the cannister and terminating at its lower end in an external driven coupler which is engaged by the drive coupler when the bowl assembly is placed on the platform; and

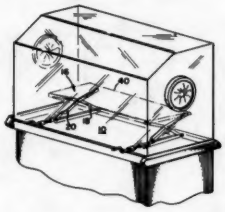
C means coupled to the upper end of the axle and rotated thereby to mix ingredients placed in the cannister, whereby the ingredients are mixed as they are being chilled by heat transfer from the frozen body.

4,885,918

INFANT INCUBATOR MATTRESS POSITIONING ASSEMBLY

Robert K. Vaccaro, Philadelphia, Pa., assignor to Air-Shields, Inc., Hatboro, Pa.

Filed Nov. 9, 1988, Ser. No. 269,129
Int. Cl.[4] A61G *11/00*; A47C *31/00*
U.S. Cl. 600—22 20 Claims



1. An infant incubator mattress positioning assembly comprising:

a deck within an infant incubator;

a first scissor linkage having first and second links attached for relative pivotal movement in a first plane;

a second scissor linkage having third and fourth links attached for relative pivotal movement in a second plane parallel to said first plane;

first attaching means for attaching a first end of said first link to said deck for pivotal movement of said first link relative to said deck;

second attaching means for attaching a first end of said third link to said deck for pivotal movement of said third link relative to said deck;

a first lead screw mechanism including:

(a) a first stationary member attached to said deck and having a first through-bore aligned with said first plane,

(b) a first movable member to which a first end of said second link is attached for pivotal movement of said second link relative to said first movable member and having a first threaded bore aligned axially with said first through-bore, and

(c) a first crank extending through said first through-bore and having a threaded length in engagement with said first threaded bore, said first crank freely rotatable within said first through-bore and restrained from axial movement relative to said first stationary member;

a second lead screw mechanism including:

(a) a second stationary member attached to said deck and having a second through-bore aligned with said second plane,

(b) a second movable member to which a first end of said fourth link is attached for pivotal movement of said fourth link relative to said second movable member and having a second threaded bore aligned axially with said second through-bore, and

(c) a second crank extending through said second through-bore and having a threaded length in engagement with said second threaded bore, said second crank freely rotatable within said second through-bore and restrained from axial movement relative to said second stationary member;

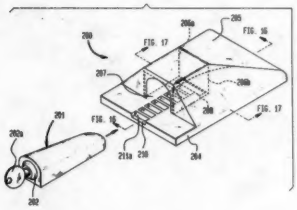
and a mattress support positioned on the second ends of said first, said second, said third and said fourth links.

4,885,919

SLIDING SHACKLE PADLOCK

Robert W. Loughlin, P.O. Box 129, Stanton, N.J. 09885, and Thomas G. Loughlin, 201 E. 17th St., Apt. 30F, New York, N.Y. 10003

Continuation-in-part of Ser. No. 94,708, Sep. 9, 1987, abandoned, and a continuation-in-part of Ser. No. 205, Jan. 2, 1987, abandoned, and a continuation of Ser. No. 673,181, Oct. 19, 1984, abandoned. This application Sep. 20, 1988, Ser. No. 246,861
Int. Cl.[4] E05B *67/36*
U.S. Cl. 70—34 32 Claims



1. A sliding shackle padlock for use with a fastening member having a fastening aperture, said sliding shackle padlock comprising:

(a) base means having a first surface and an opening extending through said base means, said opening being adapted to receive therethrough a portion of the fastening member so that at least a portion of the fastening aperture is arranged adjacent to said first surface;

(b) an elongated shackle member slidably movable relative to said base means along said first surface for insertion into and engagement with the fastening aperture, said elongated shackle member having a tapered section, said tapered section having a first end and a second end, and said first end having a lateral dimension less than the lateral dimension of said second end; and

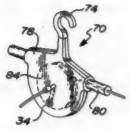
(c) securement means for securing said elongated shackle member to said base means when said tapered section is in tight engagement within the fastening aperture.

4,885,920

GARMENT SECURITY DEVICE

Donna J. Larson, 6377 Rustic Ridge La., Grand Blanc, Mich. 48439

Filed Apr. 11, 1988, Ser. No. 182,300
Int. Cl.[4] E05B *69/00*
U.S. Cl. 70—49 2 Claims



1. A security hanger which prevents the unauthorized removal of a garment from a conventional garment rack, the security hanger being portable and compact when not in use enabling convenient storage in a handbag, the security hanger comprising:

(a) a hanger housing;

(b) a reelable cable disposed within the hanger housing, the reelable cable having a lockable end, the reelable cable being spring tensioned enabling the reelable cable to auto-

matically retract into the hanger housing when the lockable end is disengaged, the lockable cable end being readily graspable when the reelable cable is in the retracted position;

(c) an elongated shoulder portion over which the garment may be suspended, the elongated shoulder portion comprising telescoping sections which collapse into each other for compact storage, the reelable cable extending through a telescoping section of the shoulder portion;

(d) means for locking the cable end into the hanger housing, the locking means being integral to the hanger housing, the lockable cable end being cooperatively engageable within the locking means until the locking means is released; and

(e) hooking means for mounting the housing to the garment rack, the hooking means being engageable to and disengageable from the garment rack.

4,885,921

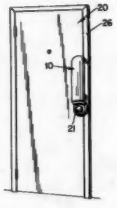
ACCESSORY FOR DOORS HAVING SUPPLEMENTAL LOCKS

Vera Sharav, 142 West End Ave., New York, N.Y. 10023

Filed Nov. 8, 1988, Ser. No. 268,488

Int. Cl.[4] B65D *55/14*

U.S. Cl. 70—159 **20 Claims**



1. A device for obscuring the portion of a door that is located a short distance above a door-knob that has a shaft, comprising:

an element which when located adjacent to a door and spaced in front of the portion of the door above the door-knob will at least partially obscure visibility of that portion of the door, and

mounting means for positioning said element spaced from said door and in front of said portion of the door to at least partially obscure visibility of said portion, said mounting means including means allowing said element to be moved from said position to enable manual access to said portion of said door,

said element having an extension which when said element is in said position extends inwardly toward the door and downwardly and at least partially around the shaft of the door-knob,

said extension having a hole therethrough which is larger in diameter than the door knob, the plane of said extension being between the plane of the door knob and the plane of the door thereby exposing the door knob to manual operation even though said element is in said position.

4,885,922

LOCKING DRIVE FOR A CENTRAL LOCKING SYSTEM

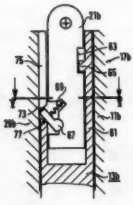
Manfred Lutz, Schweinfurt, Fed. Rep. of Germany, assignor to Fichtel & Sachs AG, Schweinfurt, Fed. Rep. of Germany

Filed Feb. 4, 1988, Ser. No. 152,378

Claims priority, application Fed. Rep. of Germany, Feb. 5, 1987, 3703392

Int. Cl.[4] E05B *65/36*

U.S. Cl. 70—264 **2 Claims**



1. A locking drive for a central locking system of a motor vehicle, comprising:

(a) a support;

(b) a reversible electric motor mounted on the support;

(c) a manual lock activating device adapted for movement relative to the support;

(d) a force-transmitting gear mechanism of which the drive path transmitting the lock restoring forces comprises two force-transmitting parts guided for translatory movement on the support and of which a first force-transmitting part is operatively coupled to be driven in the locking direction and in the unlocking direction by the electric motor, and of which a second force-transmitting part is operatively coupled to be driven manually by means if the lock activating device in the locking direction and in the unlocking direction, the first force-transmitting part being disposed in the drive path between the electric motor and the second force-transmitting part, the second force-transmitting part carrying at least one catch pretensioned to elastically engage in a ratchet recess of the support, the first force-transmitting part comprising, associated with the catch, a lifting means for lifting the catch out of the ratchet recess, the first and the second force-transmitting parts being coupled to each other in the drive path via an idle travel coupling which permits a limited idle travel of the first and of the second force-transmitting part relative to each other; and

(e) a locking means with a locking member for arresting the second force-transmitting part at least in the unlocking direction relative to the support and with a control arrangement controlling the locking member according to the position of the first force-transmitting part, the locking member being mounted on the second force-transmitting part for movement transversely of the direction of movement of the second force-transmitting part.

4,885,923

COMBINATION LOCK

Hatsuo Nakai, Toyonaka, Japan, assignor to Clover Co., Ltd., Osaka, Japan

Filed Feb. 29, 1988, Ser. No. 161,570

Claims priority, application Japan, Sep. 2, 1987, 62-219688

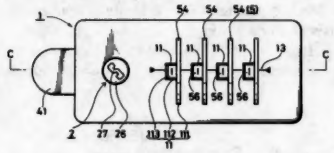
The portion of the term of this patent subsequent to Sep. 13, 2005, has been disclaimed.

Int. Cl.[4] E05B *37/00*

U.S. Cl. 70—284 **9 Claims**

1. A combination lock comprising a key-operated locking means and a dial lock means, said dial lock means having indicia, operable means on said dial lock means engageable with said key-operated locking means to provide for control-

ling the operation of said key-operated locking means, said dial lock means having a setting means providing for arbitrarily selecting a setting of said indicia for releasing said dial lock means, whereby said indicia for releasing said combination lock means can arbitrarily be selected and set by the user of the lock, said dial lock means comprising a housing and a plurality



of rotatably mounted dial means in said housing, said housing access means in the form of holes in said housing which are adapted to receive a manually inserted external guide tool so that a user of the lock can insert said guide tool in said holes to determine the set combination to open the dial lock means in cases where the set combination is unknown to the user.

4,885,924

METHOD OF FORMING CONTAINERS

Paul C. Claydon, Swindon, and Martin F. Ball, Shrivenham, both of England, assignors to Metal Box p.l.c., Reading, England

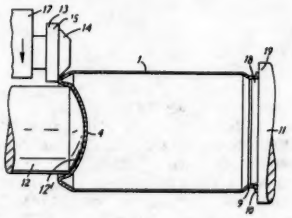
PCT No. PCT/GB83/00017, § 371 Date Sep. 26, 1983, § 102(e) Date Sep. 26, 1983, PCT Pub. No. WO83/02577, PCT Pub. Date Aug. 4, 1983

PCT Filed Jan. 28, 1983, Ser. No. 541,346

Claims priority, application United Kingdom, Feb. 2, 1982, 8202968

Int. Cl.[4] B21D *51/26*

U.S. Cl. 72—109 **6 Claims**



1. A method for reshaping a bottom wall of a container having a side wall and said bottom wall, the side wall extending substantially axially to a free edge defining a mouth of the container, and the bottom wall comprising a preformed central panel, an annular wall extending from the periphery of the central panel, and an outwardly convex portion defining an annular support surface for the container, said outwardly convex portion joining the annular wall to said side wall and including a transitional portion integral with said side wall, said method comprising the steps of applying first support means to the mouth of the container and second support means to the central panel of said bottom wall, applying a roll to the transitional portion of the container, and moving the roll towards the container axis so that relative rolling motion between the roll and the container reshapes the transitional portion and tightens the curvature of the convex portion.

4,885,925

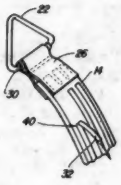
STRAP FOR AUTOMOTIVE BODY WORKING

Steven C. Place, P.O. Box 164, Wixom, Mich. 48096, and Arnold S. Hoffman, 20409 Lexington, Redford, Mich. 48240

Filed Dec. 9, 1988, Ser. No. 281,649

Int. Cl.[4] B21D *1/12*

U.S. Cl. 72—292 **6 Claims**



1. A device for use in repairing automotive bodies comprising:

an elongated flexible strap having a flat and elongated side, a ring,

means for attaching said ring to an end of said strap,

at least one elongated flat strip, said strip having an adhesive layer on both sides of the strip,

wherein one side of said strip is adhesively secured to the elongated flat side of said strap,

wherein the other side of said strip is removably adhesively secured to the automotive body so that a longitudinal force imposed on said strap through said ring is transmitted through said strip to the automotive body.

4,885,926

APPARATUS FOR THE PRODUCTION OF SPACER FRAMES

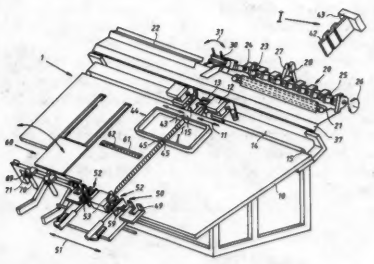
Peter Lisec, Bahnhofstrasse 34, A-3363 Amstetten-Hausmening, Austria

Filed May 10, 1988, Ser. No. 192,164

Claims priority, application Austria, May 11, 1987, 1183/87; May 18, 1987, 1256/87

Int. Cl.[4] B21D *7/00, 43/00, 53/74*

U.S. Cl. 72—306 **38 Claims**



1. Apparatus for the production of spacer frames for insulating glass from a hollow molding, comprising a plate (10), two bending heads (12) positioned along an edge portion of said plate (10), said bending heads capable of being displaced along an axis both toward and away from one another along said edge portion to position said bending heads relative to said hollow molding at spaced locations, a transfer device (60) which is pivotable with respect to the plate (10) in order to remove spacer frames (44) from the bending apparatus (1), conveyor slide means capable of being displaced along an axis along a second edge portion of said plate (10) opposite that along which said bending heads are displaced, said conveyor

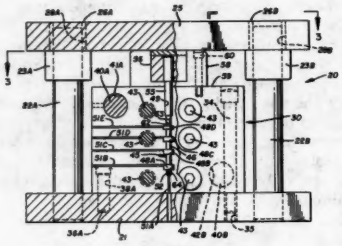
slide means (50) being laterally displaceable from a position opposite said bending heads to a position adjacent transfer device (60), said transfer device (60) being pivotable about an axis parallel to the direction of movement of said conveyor slide means, and conveyor means (41,42) to convey spacer frames (44) removed from sand bending beads (12) after termination of said bending operation to said conveyor slide means (50).

4,885,927

METHOD AND APPARATUS FOR PRESS FORMING INTRICATE METALLIC SHAPES SUCH AS SPOOL VALVE ELEMENTS

William R. Corkin, Ypsilanti, and Ram D. Bedi, Birmingham, both of Mich., assignors to General Motors Corporation, Detroit, Mich.

Filed Sep. 12, 1988, Ser. No. 242,581
Int. Cl.[4] B21K *1/06*
U.S. Cl. 72—342 8 Claims



1. A process for net forming metallic articles from cylindrical slugs, said articles having a distal end, a proximal end, and a plurality of cylindrical portions of predetermined diameters interconnected between the ends by a central shaft of less diameter than the predetermined diameters, said process comprising the steps of: providing a ram punch; providing a fixed die having a cavity with opposed ends, at least one end of the cavity being open and being disposed proximal to the ram punch, the second end of the cavity being located distal with respect to the ram punch, the cavity being contoured to the shape of the finished article to be net formed therein; providing a metallic slug made of a eutectic alloy; inserting the metallic slug within the cavity in the die; heating at least the die cavity to the recrystallization temperature of the eutectic alloy from which the slug is formed; driving the ram punch into the open end of the cavity to engage the end of the slug located closest to the open, proximal end of the cavity; and, press forming the slug into close conformity with the contours of the cavity, said forming being completed at the distal end of the cavity and thereafter being progressively completed toward the proximal end thereof.

4,885,928

CRIMPING APPARATUS

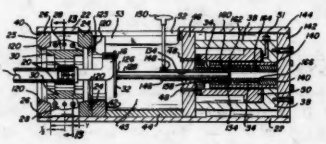
Edward H. Davis; Gerald F. Klaes, both of Denver; Jack L. Harris, and Paul L. Douglass, both of Lakewood, all of Colo., assignors to The Gates Rubber Company, Denver, Colo.

Filed Jan. 19, 1988, Ser. No. 145,445
Int. Cl.[4] B21D *41/04;* B23P *11/00*
U.S. Cl. 72—410 6 Claims

1. In a crimping apparatus of the type with first and second crimping rings that are arranged coaxial with and axially spaced apart from each other along a ring axis, the rings having facing frustoconical surfaces that engage oppositely facing frustoconical surfaces of a plurality of crimping members interpositioned between the rings and arranged substantially circumjacently around the ring axis and where one ring is stationary and the other ring is reciprocally moveable along the ring axis a distance and the crimping members are moveable in the direction of the ring axis and in relation to the moveable ring an amount one half that of the moveable ring, a ram means for reciprocating the moveable ring along the ring axis, and a depth stop means for locating an item to be crimped by the crimping members, and wherein the improvement comprises;

means for positioning the depth stop along the ring axis and in relation to a position of the crimping members along the ring axis and comprising;

means for fixing a spring means between the moveable ring and a stationary portion of the crimping apparatus to



elongate the spring means when the moveable ring is displaced toward the stationary ring, the spring means having (1) an axis aligned with the ring axis and (2) a mid-portion located along the length of the spring means with the mid-portion being moveable in the direction of the ring axis an amount one half that of the moveable ring; and

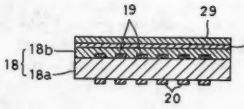
means for fixing an end portion of the depth stop means to the mid-portion of the spring means such that the depth stop means is moveable with the mid-portion of the spring means and in the direction of the ring axis an amount substantially equal one-half the distance of the moveable ring.

4,885,929

OZONE GAS SENSOR AND OZONE GAS DETECTING DEVICE HAVING OZONE GAS SENSOR

Riichiro Kasahara, and Tadashi Takada, both of Osaka, Japan, assignors to New Cosmos Electric Co. Ltd., Osaka, Japan

Filed Oct. 6, 1988, Ser. No. 254,185
Claims priority, application Japan, Oct. 8, 1987, 62-255477
Int. Cl.[4] G01N *27/00*
U.S. Cl. 73—23 9 Claims



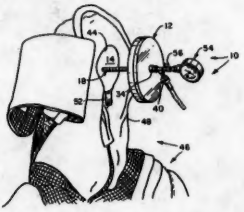
1. An ozone gas sensor comprising a film type semiconductor element including a substrate and a semiconductor film consisting of a metallic oxide formed on the substrate, and a layer of silica formed on a surface of the film type semiconductor element, wherein at least one thin film layer selected from metals and metal oxides is interposed between said semiconductor film and said layer of silica.

4,885,930

GARMENT PRESSURIZING APPARATUS

Walter N. Werner, Philadelphia; Jeffrey K. Biscardi, Perkasie, and Edward L. McClain, Elkins Park, all of Pa., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Aug. 30, 1988, Ser. No. 238,675
Int. Cl.[4] G01M 3/02
U.S. Cl. 73—37 13 Claims



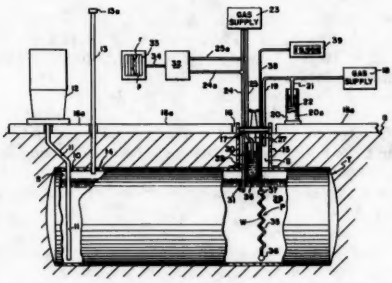
1. Apparatus for pressurizing a garment, comprising:
an interior sealing element having a rigid plate and a compressible gasket;
a tube having a longitudinal axis, said tube being affixed to and passing through the center of said interior element;
an exterior sealing element having a rigid plate and a compressible gasket, with a hole through the center thereof sized to clear said tube;
compression means for drawing said interior and exterior elements together along said longitudinal tube axis; and
check valve means for applying gas to said tube at a pressure above atmospheric;
said interior and exterior sealing elements being arranged in said apparatus with said gaskets thereof adjacently disposed along said tube and said apparatus being operable at an opening in the garment by manipulating said compression means to grip that portion of the garment located about the full periphery of said opening between said interior and exterior elements while the garment is pressurized.

4,885,931

SYSTEM FOR DETECTING LEAKS IN UNDERGROUND FUEL TANKS AND THE LIKE

John A. Horner, 387 River Dr., Lagoon Beach, Bay City, Mich. 48710

Filed Mar. 14, 1988, Ser. No. 167,779
Int. Cl.[4] G01M 3/30
U.S. Cl. 73—49.2 19 Claims



1. A system for detecting leaks in incompletely filled liquid storage tanks, incorporating projecting fill and vent pipes, which systems are connected with a liquid withdrawal system normally isolated from the atmosphere, comprising:
a. means for filling the tank space above the surface of the liquid therein with a gas under a pressure greater than atmospheric pressure and maintaining a gaseous pressure on the said liquid surface;
b. a fluid containing receptacle disposed in the tank space above the surface of the liquid;
c. means including a pair of tubular parts, one extending to a predetermined depth of submersion in the liquid in the tank and the other extending to a predetermined depth of submersion in the fluid in the receptacle for forcing a continuous stream of bubbles of gas into the said liquid and into the said fluid whereby the resistance to gas introduction is influenced in each by the composite effect of the pressure of the gas on the surface of the liquid and the head at which the bubbles are introduced; and
d. means for balancing the pressure required to flow the continuous stream of bubbles into the liquid against the pressure required to flow the continuous stream of bubbles into said fluid and indicating any differential pressure variation over a time period.

4,885,932

DETERMINATION OF CLEANLINESS LEVEL OF FOAM RESERVOIR

Mary B. Heffernan, Encinitas, Calif.; Kenneth A. Norton, and Bruce Cowger, both of Corvallis, Oreg., assignors to Hewlett-Packard Company, Palo Alto, Calif.

Filed Jul. 10, 1987, Ser. No. 72,081
Int. Cl.[4] G01N 11/00
U.S. Cl. 73—53 17 Claims

1. A method of determining cleanliness level in foams used as ink reservoirs and ink delivery systems in ink-jet printing to ensure removal of contaminants from said foam so as to provide ink stored in said foam with at least adequate ink fluid properties, said method comprising performing at least one of the following procedures:
(a) determining whether the amount of non-volatile residues is greater or less than about 0.2% by weight; and
(b) measuring whether surface tension of ink vehicle prior to and following exposure to said foam and determining whether the measured value of surface tension of ink vehicle following exposure to said foam is at least equal to or less than about 40 dyne/cm or whether the drop in surface tension of ink vehicle so exposed is greater or less than about 7 dyne/cm, with adequate ink fluid properties being associated with (1) an amount of non-volatile residues of less than about 0.2% by weight, (2) a final measured value of surface tension of at least about 40 dyne/cm for inks formulated for specially-coated paper, or (3) a drop in surface tension of less than about 7 dyne/cm for inks formulated for plain paper.

4,885,933

HARDNESS IMPACT TESTER

Everett N. Hiestand, Galesburg, and Stephen Balog, Kalamazoo, both of Mich., assignors to The Upjohn Company, Kalamazoo, Mich.

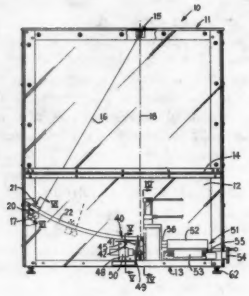
Filed May 24, 1988, Ser. No. 197,841
Int. Cl.[4] G01N 3/52
U.S. Cl. 73—79 11 Claims

6. A pendulum-type tablet impact tester for measuring the hardness of a tablet used in pharmaceutical applications, said impact tester comprising:
a spherical indenter adapted to swing through a controlled arc and strike a tablet held in a fixed position;
indenter positioning means for maintaining said spherical indenter at an initial height at the top of said controlled arc and for releasing said spherical indenter when a release signal is applied to it;
tablet positioning means for maintaining said tablet in a fixed

position, said tablet positioning means comprising a split die having variable die wall pressure controlling means;

shutter means for preventing said spherical indenter from restriking said tablet;

first sensing means comprising a photocell for activating a



monitoring device and said shutter means upon detection of the spherical indenter swinging through said controlled arc; and

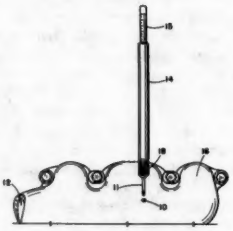
second sensing means comprising a pair of photocells spaced along said arc for calculating the velocity of the spherical indenter after it has struck the tablet.

4,885,934

EXHAUST BACKPRESSURE TESTER

Forrest F. Freeman, 4014 SW. Marigold St., Portland, Oreg. 97219

Filed Jan. 4, 1988, Ser. No. 140,551
Int. Cl.[4] G01M *15/00*; G01L *7/00*
U.S. Cl. 73—115 **7 Claims**



4. A method for measuring exhaust backpressure in an internal combustion engine comprising the steps of:

providing a pressure indicating device of the type having an elongate probe which communicates fluid pressure to an interior portion of the device;

locating a wall of a manifold, pipe, muffler, catalytic converter or which is in fluid communication with an exhaust port of the internal combustion engine;

creating a bore through the wall of a size sufficient to just receive the probe therethrough;

inserting the probe in the bore in unsealed and unthreaded relation therewith;

reading the backpressure indicated by the device;

withdrawing the probe from the bore; and

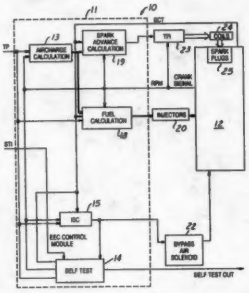
inserting a plug into the bore, said plug having a diameter sufficient to frictionally engage the radially inner surface of the bore thereby plugging the bore against exhaust leakage.

4,885,935

ENGINE TESTING SYSTEM

Roger K. Feller, Canton; Samuel R. Warner, Ypsilanti, and Janice D. Capriotti, Novi, all of Mich., assignors to Ford Motor Company, Dearborn, Mich.

Filed Jun. 27, 1988, Ser. No. 211,601
Int. Cl.[4] G01M *15/00*
U.S. Cl. 73—117.2 **1 Claim**



1. A method for controlling engine operation during end of production line engine testing including the steps of:

determining the air charge of the engine by sensing engine speed and by sensing the throttle angle of the engine;

determining a desired engine operating parameter as a function of engine speed and air charge of the engine;

operating the engine as a function of the determined desired engine operating parameter;

determining if the engine coolant temperature is greater than a predetermined value;

establishing the engine is operating at idle state by determining if the engine is operating at a steady state and determining if the throttle angle of the engine is stable, at closed throttle, and if the engine speed is stable; and

initiating self test of the engine by;

determining if engine coolant temperature is within a predetermined temperature range;

determining if engine coolant temperature is above a predetermined temperature magnitude;

determining if throttle angle magnitude is within a predetermined range;

determining if engine idle speed is greater than a predetermined magnitude; and

determining if the duty cycle of a signal applied to an engine idle speed control valve is above a predetermined value.

4,885,936

AUTOMATIC LOADWHEEL CLEANER

Richard H. Hayes, Talmadge, Ohio, assignor to Eagle-Picher Industries, Inc., Cincinnati, Ohio

Filed Sep. 26, 1988, Ser. No. 248,978
Int. Cl.[4] E01C *23/00*
U.S. Cl. 73—146 **4 Claims**

1. In a tire testing machine having a frame, a rotating loadwheel mounted on said frame, and having a wide surface against which tires are repeatedly pressed to simulate road conditions,

a loadwheel cleaner comprising,

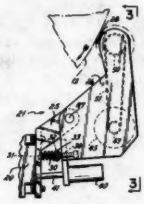
a bracket mounted on said frame adjacent said loadwheel,

a brush carrier pivotally mounted on said bracket,

a wire brush rotatably mounted on said carrier adjacent said loadwheel,

a motor mounted on said carrier and connected to said brush to rotate said brush,

a spring between said carrier and frame urging said brush into engagement with said wheel,



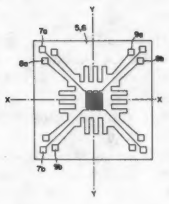
and a piston and cylinder connected between said carrier and frame to move said brush away from said loadwheel.

4,885,937

FLOW SENSOR

Nobuyuki Tanaka, Kyoto; Yasuhiko Inami, Nara; Masaya Hijikigawa, Yamatokoriyama, and Shoei Kataoka, Tanashi, all of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Mar. 31, 1988, Ser. No. 175,561
Claims priority, application Japan, Mar. 31, 1987, 62-79244
Int. Cl.[4] G01F *1/68*
U.S. Cl. 73—189 **10 Claims**



1. A flow sensor comprising a single substrate, a heating element disposed on said substrate, and four or more fluid-temperature sensing elements disposed with an equal space therebetween on a virtual circle around said heating element, wherein said substrate is made of a heat-insulating material with a thermal conductivity of 2 w/m·k or less.

4,885,938

FLOWMETER FLUID COMPOSITION CORRECTION

Robert E. Higashi, Shorewood, Minn., assignor to Honeywell Inc., Minneapolis, Minn.

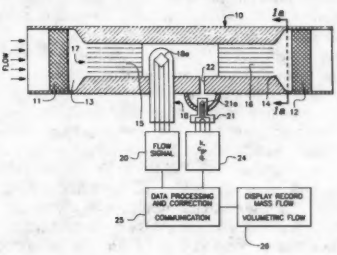
Filed Dec. 16, 1988, Ser. No. 285,896
Int. Cl.[4] G01F *1/68*
U.S. Cl. 73—204.18 **4 Claims**

1. A method for compensating the mass flow measurement of a fluid flowmeter of the thermal microanemometer class for changes in the composition of the fluid of interest the flow of which is sought to be determined or monitored comprising the steps of:

obtaining an on-going uncorrected nulled mass flow value (M_o)for the fluid of interest in relation to the microanemometer sensor output;

obtaining the specific heat (c_p) thermal conductivity (k) and density (q)

obtaining the corrected mass flow (M) from the nulled mass flow according to the relationship



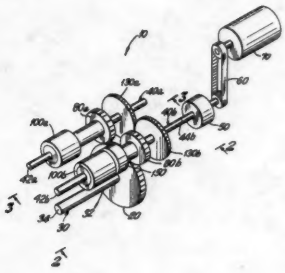
$$M = \frac{M_o c_p}{k(3.8 + q)}$$

4,885,939

DYNAMOMETER FOR TESTING ECCENTRIC CONTRACTIONS AND CONCENTRIC CONTRACTIONS WITH FREE-LIMB ACCELERATION

Matt Martin, Sayville, N.Y., assignor to Lumex, Inc., Bay Shore, N.Y.

Filed Jan. 21, 1988, Ser. No. 146,576
Int. Cl.[4] A61B *5/22*; A63B *21/24*
U.S. Cl. 73—379 **12 Claims**



1. An improved human performance dynamometer for testing muscle contractions of a user exerted against a limb engaging means, the dynamometer comprising:

a first parallel shaft;

a second parallel shaft;

a rotative power means rotating in a first rotational direction at a first rotational speed, said rotative power means connected either to the first parallel shaft or the second parallel shaft;

first gearing means for gearing together the first parallel shaft and the second parallel shaft;

a first overrunning clutch supported on the first parallel shaft, said first overrunning clutch having a first outer race and a first inner race;

a second overrunning clutch supported on the second parallel, a shaft, said second overrunning clutch having a second outer race and a second inner race;

an input shaft connected to the limb engaging means;

second gearing means for gearing the input shaft to the first inner race and the second inner race, whereby when the user exerts a force in a second rotational direction on the limb engaging means, the input shaft rotates in the second rotational direction, and the first inner race and the second inner race both rotate in the first rotational direction and

whereby when the user exerts a force in the first rotational direction on the limb engaging means, the input shaft first rotates in the first rotational direction, and the first inner race and the second inner race both rotate in the second rotational direction;

first engagement means for locking the first outer race to the first parallel shaft and for unlocking the first outer race from the first parallel shaft; and

second engagement means for locking the second outer race to the second parallel shaft and for unlocking the second outer race from the second parallel shaft, whereby when the first outer race is locked to the first parallel shaft and the second outer race is locked to the first parallel shaft, rotation of the limb engaging means by the user in either the first rotational direction or the second rotational direction at a second rotational speed which is proportional to the first rotational speed results in concentric muscular contractions with free-limb acceleration.

4,885,940

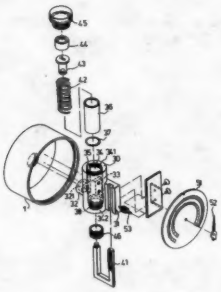
COMPACT PRESSURE GAUGE

Huang, Tien-Tsai, No. 4, Lane 30, Wu-Chuan Street, Pan-Chiao, Taiwan

Filed Feb. 21, 1989, Ser. No. 312,203

Int. Cl.[4] G01L *7/16*

U.S. Cl. 73—744 **4 Claims**



1. A pressure gauge including:

an outer housing;

a body accommodated removably within said outer housing and having a straight intake passage;

a rotating shaft journalled in said outer housing including a pinion fixed on said rotating shaft, and an indicator secured to said rotating shaft for displaying rotational degree of said rotating shaft;

a cylinder, accommodated within said body, communicated with and perpendicular to said intake passage, having a piston and a U-shaped piston rod which has generally parallel first and second arms, said first arm extending into one end of said cylinder and said second arm being positioned outside said cylinder and including a rack secured to said second arm for meshing with said pinion of said rotating shaft;

means for guiding said second arm of said U-shaped piston rod to effect a rectilinear sliding movement in said outer housing;

a spring unit connected to said piston in said cylinder for biasing said piston against compressed gas pressure exerted on said piston;

characterized by said body having a sealed cylindrical chamber in which said cylinder is received in such a manner that said piston rod extends out of said chamber and a space is defined in one end of said chamber by the other end of said cylinder, and an axially extending slot formed in an inner surface of said body in communication with said intake passage and said space so as to move said piston when compressed air flows into said intake passage.

4,885,941

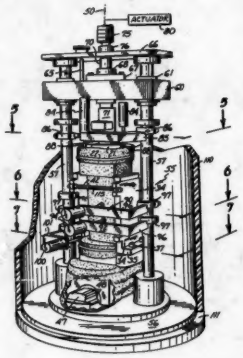
BI-AXIAL GEOMATERIAL TEST SYSTEM

Ionnis G. Vardoulakis, Minneapolis, and Andrzej Drescher, New Brighton, both of Minn., assignors to Regents of the University of Minnesota, Minneapolis, Minn.

Continuation of Ser. No. 207,148, Jun. 15, 1988, Pat. No. 4,325,700. This application Apr. 28, 1989, Ser. No. 345,008

Int. Cl.[4] G01N *3/24*

U.S. Cl. 73—794 **5 Claims**



1. A bi-axial test apparatus for testing geomaterial sample specimens for failure under load in direction generally along a central axis of the specimen, which has first and second end surfaces, and first and second generally parallel side surfaces comprising a support plate supporting a first end surface of said specimen, means for restraining movement of the parallel side surfaces of a specimen to be tested in a first lateral direction perpendicular to the axis of loading, the specimen being tested being substantially unrestrained from shifting in directions parallel to the first and second side surfaces, means for loading such specimen on a second end surface under a load directed toward the support plate along the central axis of the specimen until such specimen fails, and means for supporting the support plate for movement relative to the means for loading along a support axis parallel to the first and second parallel side surfaces of such specimen and perpendicular to the loading direction, comprising a slide member having spaced parallel guide ways that provide friction free movement of the support plate relative to the means for loading.

4,885,942

ULTRASOUND FLOW RATE METER USING A PHASE DIFFERENCE METHOD AND APPARATUS

Valentin Magori, Muenchen, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Sep. 22, 1987, Ser. No. 99,782

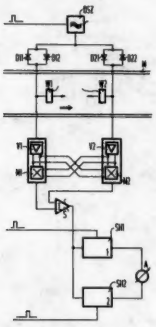
Claims priority, application Fed. Rep. of Germany, Sep. 30, 1986, 3633228

Int. Cl.[4] G01F *1/66*

U.S. Cl. 73—861.28 **4 Claims**

1. An ultrasound flow rate meter based on measuring the phase difference, comprising, a tube in which fluid flows, first and second ultrasound transducers mounted in said tube along the flow axis of said tube to transmit and receive ultrasound energy, an oscillator connected to said first and second ultrasound transducers and periodically transmitting ultrasound signals, first and second reception amplifiers, respectively,

connected to said first and second ultrasound transducers, an evaluation unit connected to said first and second reception amplifiers and evaluating the phase relationship of the signals occurring at the outputs of said first and second reception amplifiers and evaluating them during reception of ultrasound signals, each of said first and second reception amplifiers (V1,



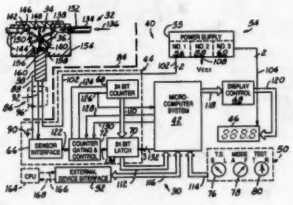
V2) respectively permanently connected to said first and second ultrasound transducers (W1, W2) and the phase relationship of the signals from said first and second ultrasound transducers (W1, W2) evaluated during the transmission of ultrasound signals and the phase difference so determined during transmission used as a reference signal to determine the phase difference of the signals during reception.

4,885,943

ELECTRONIC FLOWMETER SYSTEM AND METHOD

Terence S. Tootell, Windsor; Keith G. Wilson, Belle River, both of Canada, and David R. Shoptaw, Livonia, Mich., assignors to Hydro-Craft, Inc., Rochester Hills, Mich.

Filed May 11, 1988, Ser. No. 193,242
Int. Cl.[4] G01F *1/12*
U.S. Cl. 73—861.77 **18 Claims**



1. An electronic flow-measuring system, having a flowmeter provided with a turbine, for accurately sensing fluid flow of a liquid over a wide range of flows including a low flow region wherein the turbine rotates at less than five revolutions per second, the system comprising:

a flowmeter body having at least one fluid passage therethrough;

a turbine having a plurality of vanes, disposed at least partially within the passage, and rotatable about an axis in response to fluid flow impinging upon the vanes;

sensing means mounted at least in part in the body for producing an electromagnetic input signal whose period is inversely proportional to the rate of rotation of the turbine by detecting movement of the vanes past a predetermined location;

signal processing means for converting the input signal into a first numerical value proportional to the period of the input signal;

digital processing means for producing from the first numerical value a second numerical value adjusted to compensate for a predetermined nonlinearity if any between the rate of rotation of the turbine and the rate of fluid flow through the body at least in a low flow region of operation of the flowmeter;

means for providing an output value corresponding to at least one of the second numerical values, and wherein

the passage through the flowmeter body is a substantially cylindrical bore at least in the vicinity of the turbine,

the turbine is mounted such that its axis of rotation is concentric to the axis of the bore, and

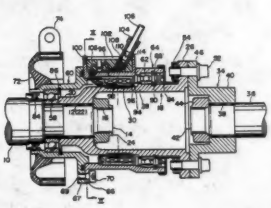
the clearance between the vanes of the turbine and the bore is sized to enable the turbine to rotate at substantially the lowest possible rate of fluid flow of the liquid.

4,885,944

TORQUE SENSOR

Toru Yagi, and Hideo Matsuki, both of Saitama, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Feb. 26, 1988, Ser. No. 160,869
Claims priority, application Japan, Feb. 27, 1987, 62-045818
Int. Cl.[4] G01L *3/10*
U.S. Cl. 73—862.36 **5 Claims**



1. A torque sensor, comprising:

a shaft whose tongue is to be measured, the shaft being divided into a first shaft half and a second shaft half;

a tubular member with an open end for receiving the first shaft half therein and a flanged end for coupling with a flanged pipe which receives the second shaft half, such that the tubular member is twisted when the first and second shaft halves rotate in opposite directions;

a magnetic element fixed on the tubular member;

an enclosure member positioned around the tubular member independently of the shaft rotation, the enclosure member housing at least a portion of the tubular member at which the magnetic element is fixed; and

detecting means positioned on an inner wall of the enclosure member for detecting changes of magnetic characteristics of the magnetic element to measure torque applied to the shaft.

4,885,945

MICROPIPETTES AND FABRICATION THEREOF

Chris Chiodo, Warren, Mich., assignor to Activational Systems, Inc., Warren, Mich.

Continuation-in-part of Ser. No. 159,197, Feb. 23, 1988, abandoned. This application Jan. 23, 1989, Ser. No. 300,816
Int. Cl.[4] C03B *23/207, 23/11*
U.S. Cl. 73—863.32 **28 Claims**

1. The method of making a pair of multiple barrel glass micropipettes comprising:

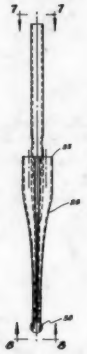
assembling multiple individual glass tubes into a bundle such that portions of the tubes in an axially central region of the bundle are arranged side-by-side and a central tube in the bundle is caused to have both of its opposite axial ends

projecting axially beyond the remaining tubes in the bundle;

softening the axially central region of the bundle;

axially elongating the softened axially central region of the bundle to form a pair of axially spaced apart opposing tapers in the bundle;

and then dividing the bundle in two at an axial location between the pair of opposing tapers to yield a pair of multiple barrel micropipettes each of which contains a corresponding one of the two tapers and each of which has the central tube projecting axially beyond the remaining tubes.



13. The method set forth in claim 1 including the step of twisting the softened axially central region of the bundle after the softening step and before the elongating step.

22. A multiple barrel glass micropipette comprising a bundle of individual glass tubes that are arranged axially side-by-side along at least a distal end portion of the bundle and are tapered to a tip in said distal end portion which is subsequently axially drawn to a desired size and said distal end portion of said tip is endowed with a bulbous shape that is radially enlarged in comparison to an immediately proximal portion of said tip but is radially smaller than the radial dimension of the bundle as measured across the axially side-by-side arranged portion thereof immediately proximal the taper.

4,885,946

MECHANISM FOR FEEDTHROUGH OF ROTARY AND/OR LINEAR MOTIONS TO A SEALED CHAMBER

Valetin Balter, Cupertino, Calif., assignor to Huntington Mechanical Laboratories, Inc., Mountain View, Calif.

Filed Dec. 19, 1988, Ser. No. 286,613
Int. Cl.[4] F16J *15/50*
U.S. Cl. 74—18.1 **18 Claims**

1. A mechanism for feedthrough of rotary and/or linear motions into an external sealed chamber located outside said mechanism via an inner sealed chamber formed inside said mechanism comprising:

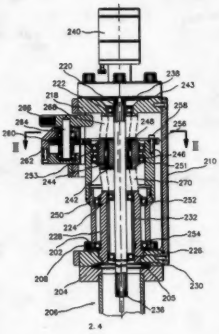
a first driven member having an axis of rotation, a through opening coaxial to said axis of rotation, and a body of revolution which is rigidly attached to the outer surface of said first driven member and has its central longitudinal axis offset with respect to said axis of rotation;

said inner sealed chamber surrounding said first driven member and having rigid portions and flexible portions, one of said rigid portions being rotatingly supported by said body of revolution;

means for causing said one of said rigid portions to describe planetary motions with respect to said axis of rotation;

a second driven means, inserted into said through opening of said first driven member so that it can move with respect to said opening;

means for driving said second driven member; and



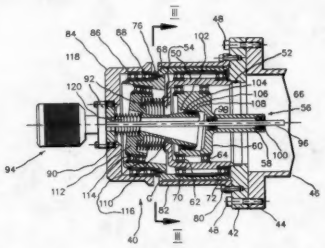
a stationary housing which has first connection means on one end for sealingly connecting said inner sealed chamber to said external sealed chamber, and second connection means for sealingly connecting said inner sealed chamber to said second drive means.

4,885,947

MECHANISM FOR FEEDTHROUGH OF ROTARY MOTION TO A SEALED CHAMBER

Valentin Balter, Cupertino, and Gerald H. Hooper, Soquel, both of Calif., assignors to Huntington Mechanical Laboratories, Inc., Mountain View, Calif.

Filed Dec. 19, 1988, Ser. No. 286,612
Int. Cl.[4] F16J *15/50*
U.S. Cl. 74—18.1 **20 Claims**



1. A mechanism for feedthrough of rotary motion into a sealed chamber, comprising:

a first driven member having an axis of rotation, a through opening coaxial to said axis of rotation, and a recess eccentric with respect to said axis of rotation;

a second driven member inserted into said through opening so that it can move with respect to said opening;

a hollow body which has a central opening, a first end, and a second end, said first end being rotatingly inserted into said eccentric recess;

first driving means which is coupled to said second end of said hollow body for causing orbital motions of the latter;

a stationary housing which encloses said first driven member, said second driven member, and said hollow body;

first sealing means for sealing a space within said stationary housing;

second driving means for driving said second driven means

for said movement with respect to said first driven member; and

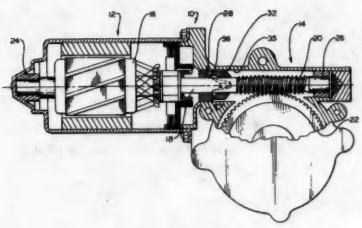
second sealing means for sealing the space within said hollow body, said first and second driving means being located outside of said sealed spaces.

4,885,948

STABILIZED MOTOR DRIVEN ACTUATOR

Robert P. Thrasher, Jr., and Gerald R. Stinson, both of Columbus, Mich., assignors to United Technologies Electro Systems, Inc., Columbus, Miss.

Filed Jul. 11, 1988, Ser. No. 217,252
Int. Cl.[4] F16C *33/22*
U.S. Cl. 74—89.14 **7 Claims**



1. An actuator comprising:

a shaft having drive means extending radially outward from the surface of said shaft;

an electric motor armature disposed on said shaft;

housing means for journaling each end of said shaft and housing said armature;

a gear disposed in said housing means for engagement with said drive means; and

shaft support means disposed about said shaft within one of said housing means between said armature and said drive means;

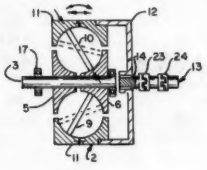
characterized by said shaft support means comprising a collar having outer surfaces lodged in said housing means and an inner diameter larger than the outer diameter of said drive means and having a plurality of fingers extending axially from said collar, each of said fingers having a surface for contacting said shaft which is radially inward from said inner diameter of said collar and which exerts a resilient force against said shaft.

4,885,949

CONTINUOUSLY VARIABLE OR FIXED RATIO VELOCITY TRANSMISSION MECHANISM

John S. Barber, Jr., 12529 Western Cape, Creve Coeur, Mo. 63146

Filed Mar. 14, 1988, Ser. No. 267,489
Int. Cl.[4] F16H *15/16*
U.S. Cl. 74—193 **40 Claims**



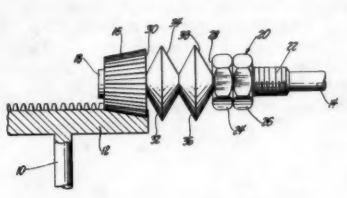
1. A traction transmission mechanism comprising a toric inner race element, a toric outer race element, encircling and complimentary with the inner race element, and arranged concentric therewith, a driving means operatively associated with one of the race elements to drive the same, a race element support means, one of said race elements being the driving race and the other of said elements being the driven race, said driving race element being formed of separate halves, transmission roller means operatively associated with said driving and driven race elements and arranged for limited pivot between the race elements to drive by traction force the said driven race element from the driving race element and thereby mounted for angular pivotal adjustment to vary the speed of the driven race element, said driven race being supported only by the driving race and the transmission roller means, and at least three equalization means operatively associated with said transmission roller means and race elements to balance any unequal forces exerted therein upon the roller means during transmission functioning, and a driven means operatively associated with the other of said inner and outer race elements and providing output force upon functioning of the transmission mechanism, said equalization means including a first equalization means operatively associated with the said transmission roller means to provide for the tangential shifting of said roller means between the race elements to induce speed variation in the output derived from the transmission mechanism, the second equalization means operatively associated with the transmission roller means, wherein said roller means being substantially loosely supported at least at one of its ends to provide for variation in the radial spacing provided between the race elements, and a third equalization means operatively associated with the transmission mechanism and providing for adjustment in the setting of the space between separate halves of one of said inner and outer race elements, with respect to each other.

4,885,950

BEVEL GEAR BACKLASH AND CLUTCH DEVICE

Roger Smith, Imlay City, Mich., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Mar. 20, 1989, Ser. No. 326,778
Int. Cl.[4] F16H *55/18*
U.S. Cl. 74—409 **1 Claim**



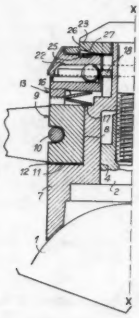
1. An antibacklash beveled gear set comprising: a first drive shaft having a first beveled gear mounted thereon, the first shaft being connected to a source of power; a second shaft having a second beveled gear adapted to mesh with and be driven by the first gear, the second gear being journaled on the second shaft, so it rotates and has limited lateral movement, a plurality of Belleville springs arranged so that juxtaposed springs form a base to base, top to top contact, the Belleville springs being coaxially aligned about the second shaft with the end of the spring stack in contact with the driven bevel gear; and an adjustable stop mounted on the second shaft at the end of the Belleville spring stack opposite the second bevel gear, the stop being adjustable longitudinally but adapted to rotate in response to rotational forces transmitted through the Belleville springs causing rotation of the second shaft.

4,885,951

INDEXATION CONTROL DEVICE FOR A CYCLE DERAILLEUR

Christian Desenclos, L'Heure, and Sinoquet Regis, Fressenneville, both of France, assignors to Sachs-Huret S.A., Nanterre, France

Filed Nov. 23, 1987, Ser. No. 123,963
Int. Cl.[4] G05G *9/00*
U.S. Cl. 74—502.2 **10 Claims**



1. A control device for a cycle derailleur comprising a support for fixing to a part of the frame or handlebar of the cycle, a lever for shifting an actuating cable of the derailleur and mounted to be rotatable about an axis relative to said support, indexation means located between the lever and the support, and adjusting means associated with the indexation means for defining a variable pitch between two successive positions of the indexation means, the indexation means comprising a fixed member connected to the support, a first annular element connected to rotate with the lever and provided with at least one series of recesses, a positioning element carried by the fixed member and cooperative with said recesses, the adjusting means comprising said first annular element whose recesses each of which is disposed along a recess line, said recesses defining therebetween pitches of a value which varies along the length of the lines, said positioning element being movably mounted on said fixed member for being selectively positioned along said recess lines in the recesses of said first annular element at positions corresponding to the desired indexation pitch, and a second annular element for shifting said positioning element relative to the fixed member, said recess lines disposed on the first annular element comprising a first rectilinear line, the other recess lines being curved lines.

4,885,952

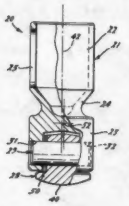
CYLINDRICAL TAPPET

Calvin C. Connell, 1618 Twelve Oaks Way, N. Palm Beach, Fla. 33408

Continuation-in-part of Ser. No. 545,117, Oct. 25, 1983, Pat. No. 4,739,675, which is a continuation of Ser. No. 206,841, Nov. 14, 1980, abandoned. This application Apr. 25, 1988, Ser. No. 185,964
Int. Cl.[4] F16H *53/06*
U.S. Cl. 74—569 **1 Claim**

1. In a tappet for transmitting motion from a rotatable cam to a reciprocal valve of an internal combustion engine, said tappet comprising a cylindrical body portion adapted to be supported by said engine for reciprocation along a first axis, a cam follower shoe having an arcuate cam engaging sole engageable with a rotatable cam having an axis of rotation extending at a right angle to said first axis, and a pivot pin supporting the cam follower shoe of said tappet for rotation relative to the body portion thereof about a second axis extending at a right angle to the first axis of reciprocation of said tappet and to the axis of rotation of said cam, the improvement comprising;

a removable shim on said pivot pin between the shoe and body portion of said tappet, said shim effecting displacement of said shoe relative to the axis of reciprocation of



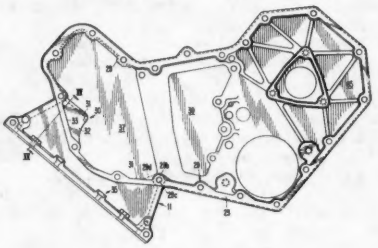
the body portion of said tappet in a direction parallel to said second axis and at a right angle to the axis of rotation of said cam thereby to vary the relationship of said rotatable cam to the arcuate sole of the shoe on said cam follower shoe.

4,885,953

GEAR TRAIN HOUSING OF AN ENGINE

Roger D. Sweetland, and Francis M. Hager, both of Columbus, Ind., assignors to Cummins Engine Company, Inc., Columbus, Ind.

Filed Jul. 2, 1984, Ser. No. 626,936
Int. Cl.[4] F16H *57/02*; F01M *13/02*
U.S. Cl. 74—606 R **7 Claims**



1. A gear train housing of an engine of the type having an internal gear space located within housing parts, which includes at least one housing body part and at least one housing cover part, said housing parts being joined together at opposed vertical oriented edge faces, with a gasket seal therebetween, by bolts passing through said housing parts and bosses of said housing body part formed at the edge face thereof so as to be situated projecting into said gear space, wherein said gear space is defined by internal wall surfaces of said housing parts which include upwardly facing sloping wall surfaces along which some of said bosses are located; wherein a substantially V-shaped lower end portion of the gear space is defined by said upwardly facing sloping wall surfaces and wherein all of the bosses on said upwardly facing sloping wall surfaces have, in a direction of gravitational fluid flow along the upwardly facing sloping wall surfaces, a wedge-like shape having a bolt hole for a bolt at a thickest portion of the wedge-like shape and tapering from said thickest portion in a direction counter to said gravitational fluid flow so as to present an upwardly facing surface that is upwardly inclined from said thickest portion at an approximately 5 degree angle from horizontal in a manner leaving said lower end portion free of any upwardly sloping surface portions which can collect fluid flowing over the bosses in

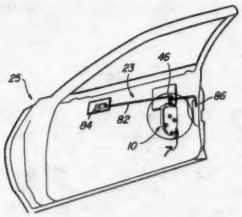
proximity to the gasket seal between the edge faces of the housing parts.

4,885,954

DOOR LOCK ACTUATOR

Bert R. Wanlass, 35 W. Valley Way, P.O. Box 206, Woodland Hills, Utah 84653

Filed Dec. 9, 1987, Ser. No. 130,715
Int. Cl.[4] E05C *3/06*
U.S. Cl. 74—625 **12 Claims**



1. A door lock actuator for use on a vehicle having a door lock system which includes a manual lock means, a locking mechanism and a connecting rod, said acutator comprising:

an output member movable between first and second positions corresponding to the locked and unlocked positions of said door lock mechanism, said output member having first and second ends;

power means for driving said output member between said first and second positions, said power means being operatively coupled to one end of said output member; and

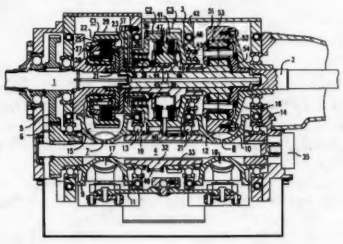
attaching means at said opposite end of said output member for attaching said output member to said connecting member, said attaching means including a bore extending through said output member and a slot intersecting said bore at an acute angle to the center line of said bore, said slot being adapted to receive said connecting rod, thereafter said bore being adapted to receive said rod upon rotation of said actuator to thereby retain said connecting rod within said output member.

4,885,955

MULTIMODE INFINITELY VARIABLE TRANSMISSION

Charles E. Kraus, Austin, Tex., assignor to Excelermatic Inc., Austin, Tex.

Filed Mar. 27, 1989, Ser. No. 328,681
Int. Cl.[4] F16H *37/00, 37/06*
U.S. Cl. 74—691 **3 Claims**



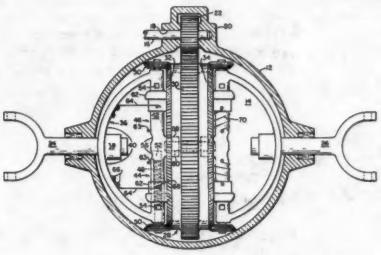
1. A multimode infinitely variable traction roller transmission comprising: a housing; coaxial input and output shafts rotatably supported in said housing; a parallel transmission shaft rotatably supported in said housing is parallel spaced relationship with said input and output shafts, said parallel transmission shaft being operatively connected to said input shaft for rotation therewith; two toric infinitely variable traction roller transmission structures including inner and outer toric discs associated with said parallel shaft, said infinitely variable traction roller transmission structures having their axially outer toric discs mounted for rotation with said parallel transmission shaft and their inner toric discs mounted on a first hollow transmission shaft surrounding said parallel transmission shaft between said toric traction roller transmission structures, each of said toric traction roller transmission structures including motion transmitting traction rollers in engagement with said toric discs and supported pivotally in unison for transmission ratio changing pivot motion; an intermediate shaft rotatably supported between said input and output shafts and having at its one end a first clutch structure for coupling said intermediate shaft selectively with said input shaft and a brake structure for locking said intermediate shaft when said first clutch structure is disengaged, said intermediate shaft carrying at its other end a planetary type transmission including a ring structure mounted for rotation with said output shaft, a planet carrier mounted for rotation with said intermediate shaft and sun structure disposed in engagement with the planets of the planetary transmission and being drivingly connected to a second hollow transmission shaft through which said intermediate shaft extends, said first and second hollow shafts having aligned chain and spur gears engaged with one another such that the chain and spur gears on said second hollow shaft rotate in opposite directions and second and third clutches associated with said chain and spur gears and selectively operable so as to cause rotation of said second hollow shaft and said sun in the same direction or in a direction opposite to the direction, of rotation of said first hollow shaft.

4,885,956

POWER TRANSMISSION

O. Sherman Yale, 2021 Pebble Beach Blvd., Sun City Center, Fla. 33570

Filed Apr. 18, 1988, Ser. No. 182,332
Int. Cl.[4] F16H *1/44*
U.S. Cl. 74—710.5 **16 Claims**



1. A power transmission comprising, in combination,

a master gear having at least one annular tooth set,

means for drivingly engaging the master gear with a power source,

a driven shaft,

a yoke member attached to the shaft and including a screw pump housing extending radially with respect to the shaft with a pair of ports in spaced relation, a pump screw rotatable in the housing and a pump gear attached to the screw and engaging said annular tooth set, and

a casing for transmission fluid, the pump housing being located for immersion in said fluid.

4,885,957

DISCONNECTABLE TRANSMISSION ASSEMBLIES

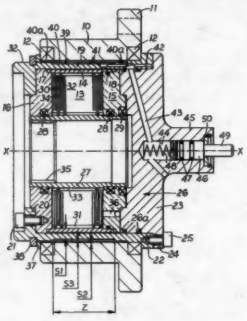
Herbert Taureg, Hennef; Helmut Wiese, Neunkirchen-Seelscheid, and Paul E. Schönenbrücher, Much-Kranüchel, all of Fed. Rep. of Germany, assignors to Viscodrive GmbH, Lohmar, Fed. Rep. of Germany

Filed Dec. 22, 1988, Ser. No. 290,180

Claims priority, application Fed. Rep. of Germany, Dec. 22, 1987, 3743474

Int. Cl.[4] F16D *47/06*; B60K *17/34*; F16H *1/44*

U.S. Cl. 74—710.5 15 Claims



1. A disconnectable transmission assembly comprising a rigid coupling member having a cylindrical bore; a viscous shear coupling mounted within the bore, the coupling comprising a rigid housing member rotatably mounted in the coupling member, and a hub within the housing member, each of the coupling member, the housing member and the hub being rotatable relative to each other about a common axis, first and second sets of annular elements in the housing, the elements of the first set being rotationally fast with the housing part and being interleaved with the elements of the second set which are rotationally fast with the hub; and a deformable sleeve interposed between opposed parts of the housing member and the coupling member, the sleeve being secured to one of said members and closing a chamber formed between the sleeve and said part of said one member; the arrangement being such that when the chamber is unpressurised said members are relatively rotatable but that the application of a predetermined fluid pressure to the chamber causes the sleeve to deform and engage said part of the other member frictionally to lock the members to rotate together.

4,885,958

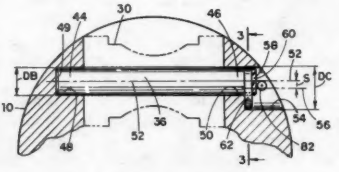
CAM ACTION PIN LOCKING MEANS FOR A DIFFERENTIAL

Gene A. Stritzel, Rochester, N.Y., assignor to D-K Gleason, Inc., Rochester, N.Y.

Filed Sep. 28, 1988, Ser. No. 250,689

Int. Cl.[4] F16H *1/38*

U.S. Cl. 74—715 5 Claims



1. A differential gear assembly of a type including a rotatable gear housing having means for receivable axle ends, substantially aligned side gears disposed within said housing for respective rotation with said axle means about a common axis, a transfer gear for operatively connecting said side gears mounted for rotation about a pin having a pair of ends, said pin being journaled within said housing by a pair of axially aligned bores in said gear housing, characterized by cam action means for restricting rotation of said pin within said bores, said cam action means including a counter bore formed in said housing and connected with one of said bores, said counter bore having a center line spaced a distance from the center line of said bores.

4,885,959

GEAR SYSTEM

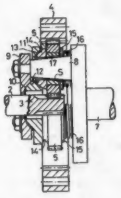
Kinichi Shinjo, 7-27-5, Ikegami, Ota-ku, Tokyo, 146, and Mutsukazu Go, 2510-11, Nagara, Gifu-shi, Gifu-ken, 502, both of Japan

Continuation of Ser. No. 35,569, Apr. 7, 1987, abandoned, which is a division of Ser. No. 730,719, May 3, 1985, Pat. No. 4,771,654. This application Sep. 19, 1988, Ser. No. 248,239

Claims priority, application Japan, Sep. 17, 1983, 58-171663; Oct. 20, 1983, 58-196907

Int. Cl.[4] F16H *1/28*

U.S. Cl. 74—801 5 Claims



1. A gear system comprising a center gear, a plurality of first gears mounted for meshing engagement with the center gear, said first gears being mounted to be axially displaceable with respect to said center gear in response to variations in thrust on said system due to uneven application of load thereto, said first gears being rotatably supported on separate conical main shafts via bearings having conical holes and being axially movable with respect to the corresponding shaft whereby the center axes of the first gears are radially displaceable from the axes of the respective main shafts and hence movable to positions of variable eccentricity to the respective main shaft, and further comprising a receiving means including a spring member and mounted to receive said thrust and to define a thrust counterbalance means for providing even application of the load to the respective first gears responsive to the thrust.

4,885,960

CONTROL SYSTEM FOR AUTOMATIC TRANSMISSION

Hiroaki Maeda, Toyota, and Masahiko Nakamura, Okazaki, both of Japan, assignors to Aisin Seiki Kabushiki Kaisha, Kariya, Japan

Filed Aug. 31, 1988, Ser. No. 238,610

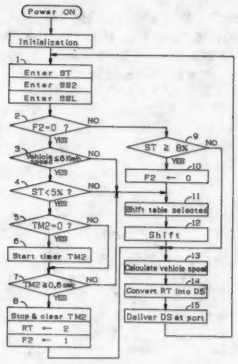
Claims priority, application Japan, Sep. 7, 1987, 62-223715

Int. Cl.[4] B60K *41/22*, *41/18*

U.S. Cl. 74—866 4 Claims

1. A control system for an automatic transmission including a transmission mechanism interposed between a drive source which is disposed onboard a vehicle and a drive output shaft and in which the transmission mechanism is automatically shifted to a second speed range other than first speed range which has a maximum speed reduction ratio when the vehicle is substantially at rest and the drive source is energized at a

level equal to or less than a given level; the control system comprising first detecting means for detecting whether the vehicle is substantially at rest, second detecting means for detecting the level at which the drive source is energized, and electronic control means for inhibiting a shaft to the second speed range when the vehicle is substantially at rest and the



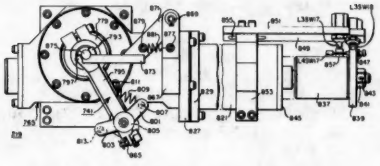
energization level of the drive source has been recognized to be equal to or less than a given value until after a given time interval passes, said time interval being equal to or larger than a time required for performing a restoring operation from a torsional deformation which is produced within the transmission mechanism.

4,885,961

REPLACEMENT OF SPLIT-PIN ASSEMBLIES IN NUCLEAR REACTOR

John D. Nee, Levelgreen, Pa., and Richard A. Green, Farmington Hills, Mich., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Division of Ser. No. 617,853, Jun. 6, 1984, abandoned. This application Nov. 6, 1986, Ser. No. 927,569
Int. Cl.[4] B25B *21/00*
U.S. Cl. 81—55 **15 Claims**



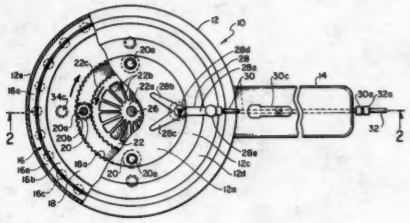
1. A pin-insertion/torque tool for the replacement of old split-pin assemblies of a guide tube of a nuclear reactor with new split-pin assemblies, each of said new split-pin assemblies including a new split-pin having tines and a new nut for securing said new split pin in said guide tube, a new nut being inserted in said guide tube in position to receive a split pin; the said pin-insertion/torque tool including a blade means for engaging a new split pin with said blade with the tines of said new split pins straddling said blade, means, connected to said blade, for advancing said split-pin into said guide tube into threading engagement with the new nut positioned to receive a new split pin and means, to be connected to said nut for securing said new nut onto said new split pin while said split pin is engaged by said blade.

4,885,962

PNEUMATIC TORQUE WRENCH FOR VALVE HANDWHEELS

Ronald L. Summers, 5245 Bergh Dr., Anaheim, Calif. 92807

Filed Feb. 6, 1989, Ser. No. 306,055
Int. Cl.[4] B25B *17/00*
U.S. Cl. 81—57.31 **12 Claims**



1. A pneumatic torque wrench for turning the handwheels of large gate, globe, angle and cross valves and the like, comprising:

(a) a wrench head section including:

(i) a housing;

(ii) a central air turbine wheel rotatably mounted within said housing and bearing gear teeth on its outer periphery;

(iii) at least three like spur gears rotatably mounted within said housing and located in uniformly spaced position about said turbine wheel and in gear mesh relationship with the gear teeth of said turbine wheel;

(iv) an annular gear ring rotatably mounted within said housing and bearing gear teeth on its inner periphery, the gear teeth of said annular ring being in gear mesh relationship with said spur gears and said annular ring bearing on its outer periphery a ball race comprising the inner race of an annular ball type bearing; and

(v) an outer ball race mounted in fixed outer peripheral relationship within said housing and interfacing in bearing relationship with the inner ball race and bearing balls maintained in equally spaced position between said inner and outer ball races to form therewith said annular ball type bearing to rotationally support said annular gear ring;

(b) air inlet channel means associated with the wrench head section for the delivery of air to said air turbine wheel to rotate said wheel and thereby, through said spur gears, rotate with increased force the annular gear ring of said wrench, and air outlet channel means associated with the wrench head section at a point removed from said air inlet means for exhausting air from said turbine;

(c) a wrench handle section mounted to the housing of said head section and extending outwardly therefrom as a lever arm, said handle section including:

(i) an air line for the delivery of air to the air inlet channel means associated with the wrench head section; and

(ii) open and close valve means for admitting and stopping the admission of air flow through the air delivery line; and

(d) drive means mounted to the underside of the annular gear ring and extending downwardly from the housing of said wrench head section to interact with the handwheel of a valve and, upon the delivery of air to said turbine wheel, provide rotational torque force to said handwheel.

4,885,963

OSCILLATING DRIVE APPARATUS FOR WORKING TOOL AND WORKING APPARATUS USING THE SAME

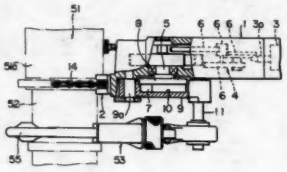
Hideichi Nishikawa, Mie, Japan, assignor to MCC Corporation, Mie, Japan

Filed Feb. 24, 1989, Ser. No. 315,475

Claims priority, application Japan, Feb. 26, 1988, 63-25710[U]; Sep. 29, 1988, 63-127557[U]; Oct. 11, 1988, 63-132490[U]; Oct. 11, 1988, 63-132491[U]; Dec. 19, 1988, 63-164281[U]

Int. Cl.[4] B28B *13/00*

U.S. Cl. 81—57.32 12 Claims



1. An oscillating drive apparatus for a working tool comprising:

a casing body;

a vise for holding a pipe, said vise being provided at the forward end of said casing body;

a motor provided inside said casing body;

a speed reducing gear train provided inside said casing body; and

an oscillating arm for driving a working tool, said oscillating arm being provided on one side of said casing body so as to be oscillated by a final output shaft of said speed reducing gear train through an oscillating drive mechanism.

4,885,964

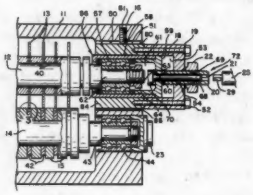
TAPE SLITTER ADJUSTMENT MEANS

Christian M. Nielsen, and James C. Bolton, both of Ojai, Calif., assignors to Industrial Tools, Inc., Ojai, Calif.

Filed Sep. 14, 1984, Ser. No. 650,430

Int. Cl.[4] B26D *1/24*

U.S. Cl. 83—56 19 Claims



1. A process of tape slitting, comprising the steps of:

(a) providing a pair of parallel gangs of knives with each knife of each gang having first and second axially opposite cutting edges;

(b) drawing web material between the gangs of knives;

(c) axially shifting one gang of knives from a first cutting position where the first cutting edges on the knives of said one gang are in positive cutting contact with the first cutting edges on the knives of the other gang to a second cutting position where the second cutting edges on the knives of said one gang are in positive cutting contact with the second cutting edges on the knives of said other gang; and

(d) simultaneously maintaining constant tension in the web material as the gangs of knives are relatively moved from their first and second cutting positions.

4,885,965

ROTARY SAW FOR SECTIONING DENTAL MODELS

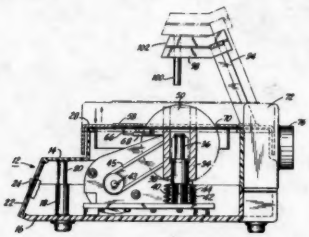
Bernard Weissman, New York, N.Y., assignor to IPCO Corporation, White Plains, N.Y.

Continuation of Ser. No. 14,662, Feb. 13, 1987, Pat. No. 4,817,839. This application Aug. 19, 1988, Ser. No. 234,301

The portion of the term of this patent subsequent to Apr. 4, 2006, has been disclaimed.

Int. Cl.[4] B26D *7/18*

U.S. Cl. 83—100 9 Claims



1. A rotary table saw for sectioning dental models, comprising:

a housing having a base portion, a motor housed in the base portion for driving a rotary blade oriented in a vertical plane, a controllable depressible horizontal work table mounted on the base portion covering the blade for freely supporting a dental model on its surface, control means responsive to the downward application of pressure on the work table for lowering the work table by a distance corresponding to the amount of pressure applied, a slit in said work table for progressively exposing said rotary blade through the work table as the work table is depressed for controlled feeding of the blade as the blade cuts upwardly through the underside of the dental model, and a vacuum outlet coupled to the base portion, the vacuum outlet being placed in flow communication with the surface of the work table during depression of the work table and transverse to the plane of the blade to remove the saw dust from the work table.

4,885,966

SAWING MACHINE

Anders Johnsen, Alderbäcken 35, S-781 93 Borlänge, Sweden

PCT No. PCT/SE88/00022, § 371 Date Sep. 23, 1988, § 102(e) Date Sep. 23, 1988, PCT Pub. No. WO88/05370, PCT Pub. Date Jul. 28, 1988

PCT Filed Jan. 22, 1988, Ser. No. 249,921

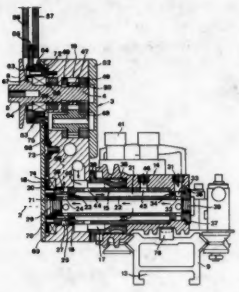
Claims priority, application Sweden, Jan. 23, 1987, 8700257-2

Int. Cl.[4] B27B *5/18*

U.S. Cl. 83—397 10 Claims

1. A sawing machine comprising a body (1), an arm (3) pivotable relative to the body about an axis (2), a member (4) on the arm, said member being arranged for connection to a saw tool (59) and being rotatable about an axis spaced from the pivot axis of the arm and generally parallel thereto, means (19) for rotating the rotatable member (4), means (38, 40) for pivoting the arm relative to the body, an element (53) rotatably arranged on the arm and adapted to be connected to a guard (58) for the saw tool, and a device comprising power transmission means (68, 68*a*) and arranged for automatic rotation of the element (53) and thereby change of the position of the guard (58) relative to the arm (3) in dependence upon pivoting of the arm relative to the body, so that when the arm (3) is pivoted

relative to the body in a first direction the rotatable element is simultaneously rotated relative to the arm in a direction opposite to this first direction, whereas when the arm is pivoted relative to the body in the other direction the rotatable element is simultaneously rotated relative to the arm in a direction opposite to said other direction, characterized in that the device for rotating the element (53) and change of the position of



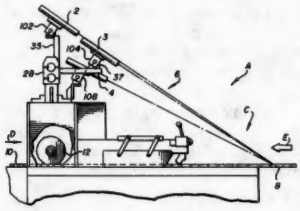
the guard (58) relative to the arm (3) comprises a part (30) secured against rotation relative to the body, located in the area of the pivot axis (2) of the arm and being generally concentric thereto, and that said power transmission means (68, 68a) for transmitting power from the part (30) secured against rotation relative to the body to the rotatable element (53) for rotation thereof on pivoting of the arm comprise at least one force transmitting element.

4,885,967

LASER ALIGNMENT DEVICE FOR SAWMILLS

David C. Bell, Baltimore, and Joe Smith, Whitehall, both of Md., assignors to J. Gibson McIlvain Company, White Marsh, Md.

Filed Aug. 25, 1988, Ser. No. 236,244
Int. Cl.[4] B27B *5/29, 5/04*
U.S. Cl. 83—520 **8 Claims**



1. A laser alignment device adapted to be mounted on a lumber cutting machine, comprising:

(a) frame means;

(b) said frame means including a plurality of vertically spaced mounting means;

(c) said mounting means each including a plurality of generally parallel, laterally spaced support rods and a screw-threaded rod positioned between said support rods;

(d) laser means adjustable mounted on each said mounting means such that one of said laser means translates over and independent of another of said laser means;

(e) each said laser means including a laser source and bracket means;

(f) each said bracket means including a plurality of laterally spaced first holes for slidably receiving said support rods, and a screw-threaded second hole for rotatably receiving said screw-threaded rod therein;

(g) each said bracket means including a support arm;

(h) said support arms being positioned with respect to each other so as to permit said arms to pass each other during an adjustment of said laser means;

(i) said support arms comprising a first arm and a second arm;

(j) each of said first and second arms including a first end for supporting respective laser source and a second end operably connected with respective mounting means;

(k) said screw-threaded rod including rotating means disposed at one end thereof; and

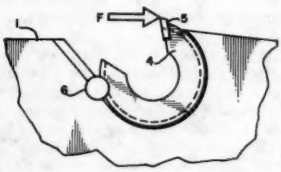
(l) wherein a rotation of said screw-threaded rod causes said bracket to be displaced axially.

4,885,968

MOUNTING OF THE CIRCULARLY FITTED INSERTED TOOTH OF A CIRCULAR SAW

Jorma A. K. Tuomaala, Oulu, Finland, assignor to Teratoute Oy, Toijala, Finland

Filed Jun. 27, 1983, Ser. No. 508,088
Claims priority, application Finland, Mar. 17, 1983, 830882
Int. Cl.[4] B27B *33/12*
U.S. Cl. 83—843 **2 Claims**



1. In the mounting of a saw tooth which is inserted on a saw blade:

an arcuate tooth,

a saw blade body having a blade edge,

a tooth notch leading from said blade edge into said saw blade body, said tooth notch having a semi-circular round bottom with opposed straight parallel sides leading from said blade edge and said tooth being fitted under compression in the semi-circular round bottom of said notch on said blade body, there being a juncture between one of the straight parallel sides the tooth and the round bottom of the notch,

and a rivet positioned at said juncture of the tooth and the blade body on the one of the straight parallel sides of said notch.

4,885,969

GRAPHIC MUSIC SYSTEM

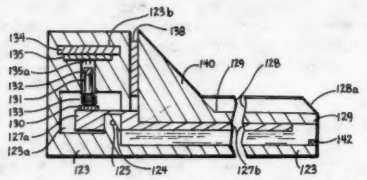
Thomas P. Chesters, 1901 Marigold Ln., Hanover Park, Ill. 60103

Filed Aug. 3, 1987, Ser. No. 81,040
Int. Cl.[4] G10H *1/00;* **G10C** *3/12*
U.S. Cl. 84—1.01 **12 Claims**

1. In a uniform keyboard for use with chromatic tone generator means, of the type having a plurality of transversely arrayed, parallel, manually depressible, alternately arranged upper case and lower case keys, the improvement comprising:

said keys being essentially coextensive, uniformly narrowed upper case keys, and uniformly widened lower case keys, with connective supportively hinging means, and with connective means for connection to said chromatic tone

generator means, whereby manual depression of said improved keys with said connective supportively hinging



means connective with said chromatic tone generator means will actuate said tone generator means.

4,885,970

MOISTURE-FREE ELECTROMAGNETIC PICKUP FOR AN ELECTRICAL MUSICAL INSTRUMENT OF THE STRINGED TYPE

C. Leo Fender, 1510 Dana Pl., Fullerton, Calif. 92635

Continuation of Ser. No. 801,475, Nov. 25, 1985, abandoned. This application Jul. 31, 1987, Ser. No. 81,630

Int. Cl.[4] G10H *3/00*; B05D *5/12*

U.S. Cl. 84—1.15 **5 Claims**

1. A method of making a pickup assembly for an electrical musical instrument of the stringed type, comprising the steps of:

providing a pickup assembly for an electrical musical instrument, the pickup assembly comprising a housing, a bobbin formed of a plastic material, a coil wrapped around the bobbin, and a plurality of pole pieces passing through the bobbin and surrounded by the coil;

placing the pickup assembly in a bath of heated liquid wax to fill voids in the pickup assembly with the wax; and

removing the pickup assembly from the bath and allowing the wax to solidify, thereby preventing moisture from getting trapped in the pickup assembly.

4,885,971

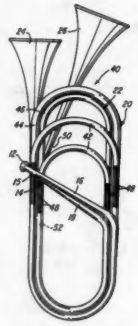
MUSICAL WIND INSTRUMENT

Philip J. Ostendorf, 1047 Mariner Dr., Key Biscayne, Fla. 33149

Filed Jan. 19, 1989, Ser. No. 300,038

Int. Cl.[4] G10D *7/10*

U.S. Cl. 84—387 **17 Claims**



1. A musical wind instrument comprising:

a mouthpiece;

energy divider means having a single inlet branch opening to said mouthpiece and plural outlet branches, not exceeding three in number, opening to said inlet branch for dividing the sound energy input to said mouthpiece into plural streams close to said mouthpiece; and

plural tubing means, one for each of said outlet branches, each of said tubing means having a proximal end opening to its associated said outlet branch and an open-ended distal end,

said mouthpiece and said inlet branch forming with each of said outlet branches a separate horn having a predetermined effective air column length, the effective air column length of each of said horns being different from the effective air column length of each other of said horns.

4,885,972

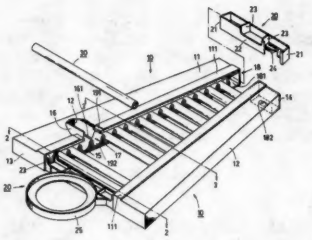
TOY XYLOPHONE

Chen-Tsung Chen, No. 16 Alley 2, Fengyuan, Taiwan

Filed May 9, 1988, Ser. No. 191,990

Int. Cl.[4] G10D *13/08*

U.S. Cl. 84—403 **5 Claims**



1. A xylophone comprising two horizontally spaced elongate supporters each of which includes a receiving space and two ends, a plurality of parallel note-producing pipes respectively having two ends thereof received in said receiving spaces, and two connectors each of which detachably connects one of said two ends of each supporter wherein each said supporter further includes a top plate, a back plate and bottom plate all of which together with said two ends of each said supporter define said receiving space and wherein said receiving space is divided into a plurality of regions for respectively receiving therein one of said two ends of each said pipe by a plurality of partitions, and the bottom of said top plate and the top of said bottom plate are respectively attached to a cushioning medium.

4,885,973

METHOD OF MAKING COMPOSITE ARTICLES

Raymond G. Spain, Farmington Hills, Mich., assignor to Airfoil Textron Inc., Lima, Ohio

Filed Dec. 14, 1988, Ser. No. 284,336

Int. Cl.[4] D04C *1/02, 1/06*; B32B *31/00*

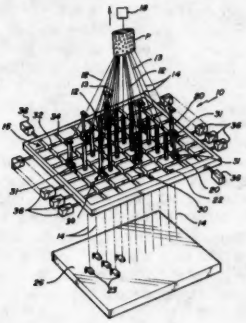
U.S. Cl. 87—1 **20 Claims**

1. A method of making a composite article, comprising:

(a) forming a braided preform including a plurality of nonfugative braider fibers and a plurality of fugative fibers,

(b) selectively removing the fugative fibers from the braided

preform to form a plurality of elongate matrix-ingress passages in said braided preform, and



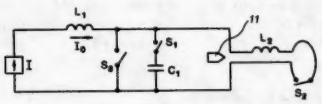
(c) impregnating the braided preform with a matrix material, including supplying the matrix material through said passages.

4,885,974

OVERPULSE RAILGUN ENERGY RECOVERY CIRCUIT

Emanuel M. Honig, Los Alamos, assignor to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Sep. 28, 1984, Ser. No. 655,593
Int. Cl.[4] F41F *1/02*
U.S. Cl. 89—8 **9 Claims**



1. An overpulse railgun energy recovery circuit for propelling a projectile along a railgun, said overpulse railgun energy recovery circuit comprising:

a railgun having an effective inductance, said railgun having a breech end, a pair of parallel rails, and a muzzle end;

a source inductor for storing current connected across said pair of parallel rails of said railgun at said breech end thereof;

means for initially charging said source inductor to an initial current for storage;

switching means connected across said source inductor with a closed position for shorting across said source inducator and an open position for enabling current flow into said effective inductance of said railgun when a projectile is ready to be propelled from said breech end towards said muzzle end of said railgun;

a muzzle switch connected across said pair of parallel rails of said railgun at said muzzle end thereof, said muzzle switch having a closed position forming a closed circuit for returning said initial current minus losses to said source inductor when a projectile has exited from said muzzle end of said railgun and an open position for disconnecting said railgun effective inductance when said current has been transferred back from said effective inductance into said source inductor; and

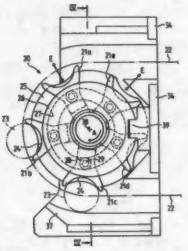
transfer capacitive means connected in parallel with said railgun inductance at said breech end thereof and with said source inductance, and having a capacitance effective to resonate with said railgun inductor and said source inductor for storing energy at a voltage developed across said railgun inductor in an amount effective to transfer energy to said railgun inductor when said muzzle switch is closed and to thereafter resonately return energy to said source inductor for storage as current for subsequent use.

4,885,975

DEFLECTOR SPROCKET FOR A CARTRIDGE FEED DEVICE IN AN AUTOMATIC MULTI-BARREL FIRING WEAPON

Erwin Bohler, Dubendorf, and Werner Bruderer, Zurich, both of Switzerland, assignors to Werkzeugmaschinenfabrik Oerlikon-Bührle AG, Zurich, Switzerland

Continuation of Ser. No. 937,691, Dec. 5, 1986, abandoned. This application Jul. 28, 1988, Ser. No. 225,489
Claims priority, application Switzerland, Dec. 10, 1985, 05257/85
Int. Cl.[4] F41D *10/04, 10/28*
U.S. Cl. 89—33.25 **3 Claims**



1. A rotatable deflector wheel arrangement for a cartridge feed device in an automatic multi-barrel cannon having a rotatable array of barrels and an endless conveyor chain for conveying the cartridges, comprising:

means defining a predetermined number of recesses for accommodating the cartridges;

said predetermined number of recesses being uniformly peripherally spaced around the rotatable deflector wheel arrangement;

said rotatable deflector wheel arrangement being operable for transferring said cartridges to the rotatable array of barrels;

said recess defining means comprising a predetermined number of radially adjustable slides defining said predetermined number of uniformly peripherally spaced recesses for accommodating the cartridges and being radially adjustable relative to said rotatable deflector wheel arrangement;

means for successively radially outwardly moving said radially adjustable slides in radial direction of said rotatable deflector wheel arrangement during rotation of the rotatable deflector wheel arrangement in order to thereby feed said cartridges to the rotatable array of barrels at a speed substantially equal to a predetermined peripheral speed of said rotatable array of barrels;

said means for successively radially outwardly moving said radially adjustable slides being operatively associated with said rotatable deflector wheel arrangement and comprises at least one stationary cam disc having a predetermined curvature and serving for radially displacing said radially adjustable slides;

a respective roller operatively associated with each said radially adjustable slide;

said rollers contacting said at least one stationary cam disc such that each said roller follows said predetermined curvature of said at least one stationary cam disc in order to thereby impart to said cartridges accommodating by said radially adjustable slides, said speed substantially

equal to said predetermined peripheral speed of said rotatable array of barrels;

barrel array drive means for rotating the rotatable array of barrels at a predetermined rotational speed and thus at said predetermined peripheral speed of said rotatable array of barrels;

at least one deflector wheel of said recess defining means;

said at least one deflector wheel radially movably supporting said predetermined number of radially adjustable slides;

deflector wheel drive means rotationally driving said at least one deflector wheel and thereby said cartridges accommodated in said uniformly peripherally spaced recesses, at a predetermined rotational speed and thereby at a peripheral speed which is lower than said predetermined peripheral speed of said barrels;

said means for successively radially outwardly moving said radially adjustable slides successively accelerating said cartridges accommodated in said uniformly peripherally spaced recesses, from said predetermined peripheral speed to speed substantially equal to said predetermined peripheral speed of said barrels for delivery to said barrels;

a rotatably journalled shaft;

said at least one deflector wheel constituting a first deflector wheel and a second deflector wheel;

said first deflector wheel and said second deflector wheel being fastened to said rotatably journalled shaft;

at least one of said first deflector wheel and said second deflector wheel slidingly contains said predetermined number of radially adjustable slides;

said first deflector wheel being located at a rear end of said cartridge to be transported and said second deflector wheel being located within the region of a cartridge case mouth; and

said first deflector wheel and said second deflector wheel together with said predetermined number of radially adjustable slides and said at least one stationary cam disc defining said rotatable deflector wheel arrangement.

4,885,976

MAGAZINE CHAIN FOR AMMUNITION

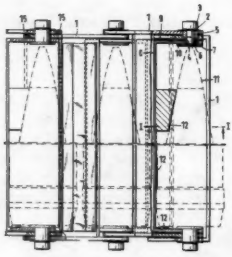
Adolf Nordmann, Erkrath, Fed. Rep. of Germany, assignor to Rheinmetall GmbH, Düsseldorf, Fed. Rep. of Germany

Filed Jun. 22, 1988, Ser. No. 210,012

Claims priority, application Fed. Rep. of Germany, Aug. 3, 1987, 3725666

Int. Cl.[4] F42B *39/08*

U.S. Cl. 89—35.01 **7 Claims**



1. In a magazine chain for receiving rounds of ammunition in a parallel series, including

end-to-end arranged like plates forming a first and a second endless link plate series extending parallel spaced to one another; with each link plate of the first series there being aligned a respective link plate of the second series;

link pins articulating the link plates of said first link plate series to one another and the link plates of said second link plate series to one another;

side-by-side arranged retaining members extending from each said link plate of the first link plate series to said respective aligned link plate of the second link plate series; the retaining members being attached to the respective aligned link plates of the first and second link plate series;

two support faces forming part of each said retaining member for partially circumferentially surrounding and engaging adjoining rounds of ammunition;

the improvement comprising:

side-by-side arranged cradles extending from the link plates of the first link plate series to a respective aligned link plate of the second link plate series; each said cradle having a length defined by opposite end walls situated adjacent respective aligned link plates of the first and second link plate series; each said cradle being articulated to respective adjacent link plates by respective said link pins; each said cradle being adapted to receive a round of ammunition additionally supported by two of the support faces belonging to adjoining said retaining members;

a slot provided in each said end wall centrally with respect thereto and generally radially to respective said link pins;

two levers associated with each said link plate; each lever having a first end articulated to the respective link plate; each lever having a second end; and

a guide pin received in each said slot and carried by respective said second ends of said levers; each said guide pin jointedly connecting together two adjoining levers articulated to two adjoining link plates of said end-to-end arranged link plates, whereby during a non-linear travel of said magazine chain, adjoining said link plates pivot with respect to one another and said two of the support faces belonging to adjoining said retaining members approach an associated said cradle from opposite sides thereof for clearing a path to move, in a direction transversely to said length, a round of ammunition from and into the cradle.

4,885,977

STABILIZED LINE-OF-SIGHT AIMING SYSTEM FOR USE WITH FIRE CONTROL SYSTEMS

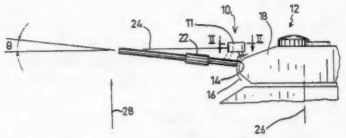
Yoram Kirson, and Itsak Marom, both of Haifa, Israel, assignors to State of Israel-Ministry of Defence Armament Development Authority, Haifa, Israel

Filed Jan. 6, 1988, Ser. No. 141,318

Claims priority, application Israel, Jan. 7, 1987, 81192

Int. Cl.[4] F41G *5/16*

U.S. Cl. 89—41.05 **12 Claims**



1. In a fire control system for gunnery weapons having a powered gun positioning system and including a gun barrel having a boresight, a stabilized line-of-sight aiming system comprising:

stabilized electro-optical means for viewing a target along a stabilized line-of-sight, said stabilized electro-optical means being fixedly supported with respect to said boresight;

means for sensing the azimuth and elevation angles of said line-of-sight relative to said boresight; and

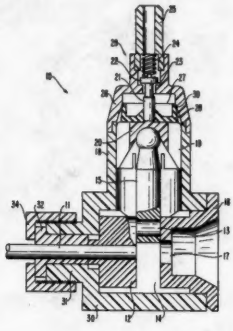
means for slaving said gun barrel in accordance with said line-of-sight by employing the azimuth and elevation angles measured by said means for sensing.

4,885,978

FLUID-OPERATED MINIATURE ENGINE

Alessandro Caenazzo, and Silvana Pasqualotto, both of San Vendemiano, Italy

Filed Apr. 27, 1988, Ser. No. 187,012
Claims priority, application Italy, May 7, 1987, 83370 A/87
Int. Cl.[4] F15B *15/22*
U.S. Cl. 91—232 20 Claims



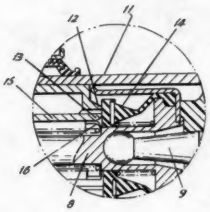
1. A miniature engine operated by an expanding gaseous fluid, comprising a cylinder having an inner circumferential wall, an inlet valve which opens so as to let the gaseous fluid into the cylinder, and a piston movable within said cylinder, said piston descending during expansion of the gaseous fluid and then ascending, wherein said piston comprises a radially expansible resilient diaphragm attached to an upper portion thereof, said resilient diaphragm contacting the inner circumferential wall of the cylinder during descent of the piston so as to form a pneumatic seal, but not contacting the inner circumferential wall of the cylinder during at least a portion of ascent of the piston.

4,885,979

BRAKING-POWER BOOSTERS WITH NOISE SUPPRESSION

Egid Macht, Tretting, and Thomas Hagel, Ebern, both of Fed. Rep. of Germany, assignors to FAG Kugelfischer Georg Schafer (KGaA), Fed. Rep. of Germany

Filed Mar. 7, 1988, Ser. No. 164,547
Claims priority, application Fed. Rep. of Germany, Mar. 24, 1987, 8704366[U]
Int. Cl.[4] F15B *9/10*
U.S. Cl. 91—369.1 10 Claims



1. A braking-power booster with noise suppression comprising:

a housing, a membrane across the housing dividing the housing into two pressure chambers; a brake booster piston extending through the housing and the membrane and through both pressure changers for moving together with the membrane; and intermediate member and a piston rod connected with the intermediate member for moving the intermediate member;

a control valve around the intermediate member, the valve comprising a sleeve sealed in and axially displaceable in the housing, the sleeve of the valve having a bore through it; a movable sealing plate in the bore and two sealing seats in the bore at a radially spaced locations for each seat moving with respect to and into and out of engagement with the sealing plate; with the radially inward valve seat off the valve plate, air passes the inward valve seat;

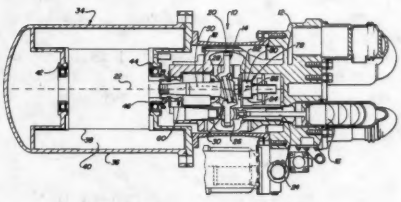
a silencer comprising a screen which is cup-shaped; the screen being disposed alongside the inward seat; the screen cup shape having a convex curvature facing toward the sealing valve seats, such that when the radially inward seat is opened off the valve plate, this permits the passage of air past the valve; the screen being shaped for silencing noise generated by the passage of air therethrough.

4,885,980

HYDRODYNAMIC BEARING

Roelf J. Meijer, and Benjamin Ziph, both of Ann Arbor, Mich., assignors to Stirling Thermal Motors, Inc., Ann Arbor, Mich.

Filed Mar. 10, 1988, Ser. No. 166,323
Int. Cl.[4] F01B *3/00, 13/04*
U.S. Cl. 92—12.2 12 Claims



1. A spherical hydrodynamic bearing for supporting a driveshaft by the housing of a thermal engine of the type wherein a plurality of reciprocating pistons act on a swashplate forming a plane tipped from normal to the axis of rotation of the driveshaft, and wherein the pistons exert a rotating bending load on the driveshaft causing a rotating bending deflection of the driveshaft, the bearing comprising:

journal means carried by the driveshaft for forming a convex spherical surface having its center coincident with the axis of rotation of the driveshaft,

bearing means carried by said housing for forming a concave spherical surface closely conforming to said journal means convex spherical surface, whereby relative motion between said spherical surfaces occurs in response to the rotating bending deflection of the driveshaft, and

passageways formed in said driveshaft for supplying lubricant to said hydrodynamic bearing.

4,885,981

SPRING RETURN CYLINDER ACTUATOR

William J. Roettger, Rice, Minn., assignor to General Signal Corporation, N.Y.

Filed Apr. 8, 1988, Ser. No. 179,541
Int. Cl.[4] F01B *29/00, 31/00*
U.S. Cl. 92—59 9 Claims

1. A spring return cylinder actuator comprising:

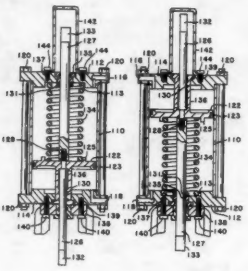
a housing having first and second fluid ports connected to a bore in said housing;

a piston in said bore movable between said first and second ports;

spring means in said housing for biasing said piston in a first direction towards a no pressure position;

first and second piston rods extending axially in opposite directions from said piston to the exterior of said housing, wherein said first piston rod extends from said housing a further distance than said second piston rod extends from said housing in said no pressure position of said piston;

rod attachment means on an exterior end of each piston rod for attaching either of said piston rods to a device to be actuated; and



exterior mounting means on each end of said housing for mounting said housing to said device to be actuated at either end of said housing;

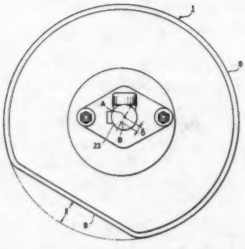
whereby said actuator can be mounted and attached to operate the device to be actuated in either a push or pull mode without disassembly of the actuator itself.

4,885,982

VACUUM-TYPE BRAKE BOOSTER DEVICE HAVING IMPROVED EASE OF MOUNTING

Morihiko Shimamura, Saitama, Japan, assignor to Jidosha Kiki Co., Ltd., Tokyo, Japan

Filed Jun. 15, 1984, Ser. No. 621,309
Claims priority, application Japan, Jul. 11, 1983, 58-125828
Int. Cl.[4] F01B *11/00*
U.S. Cl. 60—547.1 **3 Claims**



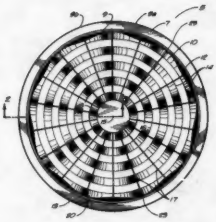
1. A vacuum-type brake booster device for automotive use comprising: a shell, an operating diaphragm mounted in said shell, an input shaft, an output shaft and a master cylinder, said shell and said diaphragm having a shape in a plane of said diaphragm having symmetry along no more than one axis lying in said plane, and said input shaft, said output shaft and said master cylinder having central longitudinal axes aligned with an effective pressure center point on said diaphragm, wherein the shape of said shell and said diaphragm is that of a circle having cut therefrom at least one segment defined by at least one chord offset from a center of said circle.

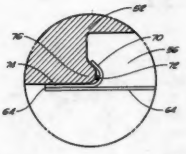
4,885,983

SELF-RETAINING DIAPHRAGM SEAL

John R. Zavoda, Houston, Tex., assignor to Zavoda Manufacturing Co., Inc., Houston, Tex.

Filed May 24, 1988, Ser. No. 198,106
Int. Cl.[4] F01B *19/00*; F16J *3/00*
U.S. Cl. 92—104 **15 Claims**





1. A fluid pressure responsive diaphragm comprising:

a discal body;

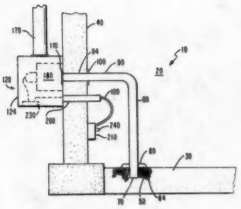
a holding ring fastened to said discal body, said holding ring having an outwardly curved lip formed at the inner edge of said holding ring, said outwardly curved lip being inward of the outer edge of said discal body, said holding ring having a thickness greater than the thickness of said discal body.

4,885,984

RADON REMOVAL APPARATUS

Paul E. Franceus, 449B Pine Bank Rd., Flemington, N.J. 08822

Filed Sep. 19, 1988, Ser. No. 245,588
Int. Cl.[4] F24F *7/06*
U.S. Cl. 98—42.02 **8 Claims**



1. A gas venting system for a building including a basement, a basement floor and a side wall comprising

a single continuous pipe having one end disposed beneath the basement floor and the other end extending through the side wall of the building,

a fan coupled to the outer wall of the side wall of the building,

said pipe being secured to said fan,

a pipe extending from said fan vertically to draw gas pulled by the fan away from the building, and

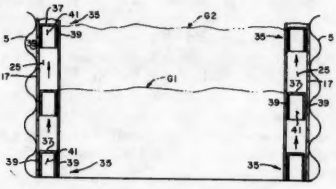
a low voltage D.C. motor coupled to and driving said fan and including a current limiter, the speed of operation of said motor varying with the load on said motor, with the speed increasing as the load increases.

4,885,985

SELF REGULATING GRAIN BIN WALL AIR SYSTEM AND METHOD

Eugene B. Pollock, Shelby, Ill., assignor to Grain Systems, Incorporated, Assumption, Ill.

Filed Mar. 21, 1988, Ser. No. 170,902
Int. Cl.[4] E04H 7/22
U.S. Cl. 98—55 **10 Claims**



1. In a grain bin having a bin wall supported on said foundation floor, a plurality of generally vertically extending, elongated air passageways within said bin, each of said air passageways having a plurality of air outlets which direct air flow from the air passageways generally into the grain along the length of the air passageway, and means for introducing air into said air passageway, and means for introducing air into said air passageways for discharge from said spaced outlets thereby to dry grain in proximity to said air passageways, the improvement comprising: means for automatically limiting the air flow through said air outlets in said air passageways above the level of the grain in the grain bin in response to changes in the level of the grain in said grain bin, said air loss reduction means associated with each of said air passageways comprising air float means in each of said air passageways to limit air flow to those outlets in said air passageways above the grain level in response to pressure changes within said air passageways.

4,885,986

AUTOMATIC COMPACT MACHINE FOR THE PRODUCTION OF COFFEE AND INFUSIONS, ESPECIALLY FOR DOMESTIC USE

Lucio Grossi, Via Sylva 30, Milano, Italy

Filed Jun. 30, 1988, Ser. No. 213,705
Claims priority, application Italy, Jul. 9, 1987, 21238 A/87
Int. Cl.[4] A47J 31/24
U.S. Cl. 99—289 R **13 Claims**

1. An automatic machine for the production of coffee, comprising:

two parallel lateral members, said members being spaced from each other, each of said lateral members being formed with a respective guide element having an axis;

a filter carrier having a carrier axis parallel to said axis of said guide elements operatively connected with said lateral members and provided with an internal compartment having a base thereof, said compartment being open upwardly at an end thereof opposite said base;

a filter disposed at said base of said compartment for filtrating a coffee infusion, said filter and said filter carrier being axially movable relative to one another;

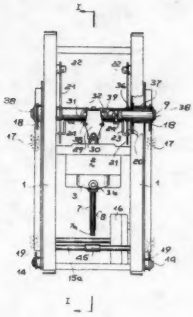
a piston axially movable up and down in said filter carrier and engageable with said compartment, said piston forming a watertight seal with said compartment, said piston being provided with means for delivering a hot water into said compartment;

a transverse bar guided in said guide elements of said lateral members and having a bar axis perpendicular to said carrier axis, said bar being operatively connected with said piston;

a geared motor having a shaft extending parallel to said bar;

a disc operatively connected with said shaft of said motor;

a first and second connecting rods adjacent to respective lateral members, each of said connecting rods being operatively connected with said transverse bar at one end of said rod and being eccentrically connected with said disc by the other end of the respective rod, so that said rods movable generally parallel to said axes of said guide elements;



elastic means operatively connected with said bar for pulling said piston toward said base of said compartment;

means on said transverse bar for friction blocking of said bar in a lower position of said piston, so that the movement of said piston upwardly upon the expansion of coffee in said compartment upon reaching said lower position of said piston is not transmitted to the gear motor;

means for expelling the exhausted infusion substance; and

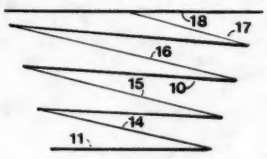
means for automatic cleaning of said movable filter operatively connected with said bar.

4,885,987

COFFEE FILTER RETAINER

Adrian R. Franke, P.O. Box 204, Minden, Nev. 89423, and Harold L. Hull, 401 Canyon Way, Sp. 43, Sparks, Nev. 89431

Filed May 23, 1988, Ser. No. 197,660
Int. Cl.[4] A47J 31/06
U.S. Cl. 99—295 **10 Claims**



1. A coffee filter retainer formed from a wire, said wire having a memory, with said retainer having a first position and a second position, said retainer being independent of but cooperating with, a coffee filter and a coffee filter basket said basket having walls, with said first position of said retainer formed to substantially conform to the inside contours of said coffee filter, when said coffee filter is placed inside of said coffee filter basket, and said retainer when compressed into its said second position being smaller than when in its said first position allowing said retainer to fit inside of said coffee filter, with said retainer when released from its said second position, returning to its said first position to force said coffee filter against the said

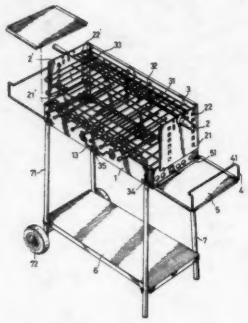
walls of said coffee filter basket, securely retaining said coffee filter in said coffee filter basket.

4,885,988

PORTABLE TROLLEY BARBECUE

Wilson Lee, No. 34, Lane 155, Yen Pin North Rd., Sec. 6, Taipei, Taiwan

Filed Nov. 2, 1988, Ser. No. 265,976
Int. Cl.[4] A47J *33/00*
U.S. Cl. 99—449 2 Claims



1. A portable trolley barbecue which comprises a base having a front, a back, and two lateral sides, two pairs of lateral U-shaped brackets on each lateral side respectively near the front and rear and one pair of central U-shaped brackets at a middle portion of each lateral side, each pair of the lateral U-shaped brackets being arranged to receive an expansion frame for supporting a side table plate placed thereon and for providing an extended portion for pushing and pulling the portable trolley barbecue, and

a cover plate for covering the base and for being locked together with the base by the expansion frames when the expansion frames are respectively pushed inward into the central U-shaped brackets, the cover plate having four corners with holes for respectively being connected to four stands by releasable joints.

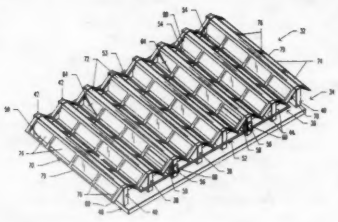
whereby the barbecue can be collapsed and arranged into a portable configuration for carriage and storage and can be set up into a trolley barbecue.

4,885,989

COOKING GRID SYSTEM

Brian A. Korpan, 540 Garfield St., New Westminster, B.C., Canada (V3L 4A7)

Filed Jul. 25, 1988, Ser. No. 223,878
Int. Cl.[4] A47J *37/07*
U.S. Cl. 99—450 7 Claims



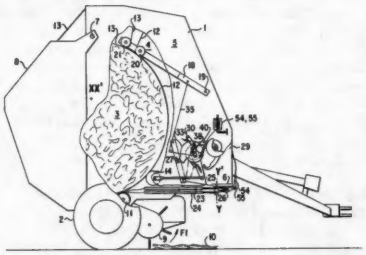
1. A cooking grid system comprising: a grid, a retainer, a replaceable cover, and a cooperative locking means between said grid and said retainer which allows said retainer to be opened to fit or remove said replaceable cover to said grid and then to be closed to releasably and positively sandwich said replaceable cover between said retainer and said grid to form an operative cooking grid, said grid comprising a plurality of spaced apart supporting bars for said replaceable cover, said grid, said retainer, and said replaceable cover being shaped relative to one another to permit said replaceable cover to be fitted to or removed from said grid and to be positively sandwiched between said retainer, and said grid, said replaceable cover provided with retainer seating portions which provide for positive positioning of said retainer when said retainer is closed onto said replaceable cover, said retainer when in a closed position being disposed adjacent said supporting bars, said replaceable cover substantially covering the top portion of said supporting bars when said replaceable cover is fitted thereto, wherein said replaceable cover is provided with a plurality of elongated canopy shaped sections being supported by said supporting bars when said replaceable cover is fitted thereto, said replaceable cover being made of a manually deformable substance, whereby: in the event of said operative grid becoming soiled said retainer can be opened and said replaceable cover can be removed from said supporting bars and a new replaceable cover can be fitted to said supporting bars and said retainer closed to provide at least one clean outer surface on said operative grid.

4,885,990

CONTROL OF TWINE GUIDE ARM IN A PICKUP BALER

Patrick Mouret, Mardie, France, assignor to Rivierre Casalis, Fleury-Les-Aubrais, France

Filed Oct. 9, 1987, Ser. No. 106,261
Claims priority, application France, Oct. 10, 1986, 86 14107
Int. Cl.[4] B65B *13/18*
U.S. Cl. 100—88 3 Claims



1. A device for controlling at least one guide arm adapted to guide twine for tying a cylindrical bale in a pick up baler, said guide arm being adapted to pivot under the action of a control cable in the proximity of said bale which rests on at least one bale driving roller adapted to rotate the bale, while a tension arm associated with the bale forming belts rests on said bale, said device comprising: a pivotally mounted tension arm for tensioning bale shaping belts and adapted to rest on a cylindrical bale, a rotary cam the profile of which has a small-radius portion and a large-radius portion, a toothed wheel coaxial to and integral with said cam, a cam-driving pawl cooperating with said toothed wheel for stepwise rotating said cam, said pawl being pivotally mounted on a cam driving arm pivotally mounted about an axis coinciding with the common axis of the cam and the toothed wheel and adapted to be subjected to alternate motion through crank means kinetically connected by said arm to a bale driving roller, a swing bar rotatively mounted on said common axis and connected through a cable to said tension arm, said swing bar being adapted to rotate a rotary lever about said common axis, said rotary lever having

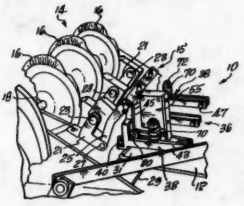
a ramp adapted to cooperate with a bent lever spring-biased toward a first position while being adapted to be moved by said ramp into a second position, said bent lever being connected by a connecting rod to a sector-shaped element pivotally mounted on said common axis and adapted to be placed between said pawl and said toothed wheel to prevent mutual engagement thereof when said bent lever is in said second position, said bent lever having a toothed portion adapted to mesh with a gear wheel when said bent lever is in said first position, said gear wheel being integral with and coaxial to a rotary twine guiding roller; and a cam follower cooperating with said cam profile and mounted on a control lever pivotally mounted at one of its ends on a fixed axis, while the opposite end of said control lever is connected through a cable to at least one movable twine guide to control the movements thereof.

4,885,991

DEVICE FOR SENSING MALFUNCTION OF TYING APPARATUS ON HAY BALER

Frank X. Borba, 14856 Road 200, Porterville, Calif. 93257

Filed Jul. 25, 1988, Ser. No. 223,655
Int. Cl.[4] B30B *15/00*; B65B *13/18*
U.S. Cl. 100—99 **7 Claims**



1. In a baler having a frame along which there is defined a controlled pathway upon which loose material is compressed into bales and secured with at least two tyable bindings, a plurality of knotter devices disposed contiguous to the pathway, and along an axis transverse thereto, for tying the bindings thereabout as the bales move along the controlled path;

each knotter device being mounted to said baler so as to provide limited arcuate movement about the axis thereof in response to a malfunction of the said knotter device;

apparatus removed from, and down stream of, said knotter devices for sensing, and responding to, said malfunction in one of said knotter devices, said apparatus comprising, in combination;

sensing elements disposed in side by side array in said apparatus, each said sensing elements being aligned with one of said knotter devices, and being movably secured to the baler;

link means providing a positive interconnection between one of said sensing elements and a corresponding knotter device, whereby arcuate movement of one of said knotter devices when said malfunction occurs is communicated to said sensing element by means of said link means;

signal means on said baler, said signal means including an actuator engaged with said sensing elements so as to be actuated by movement of the sensing element in response to said malfunction in one of said knotter devices.

4,885,992

VERTICAL ROTARY INDIRECT PRINTER

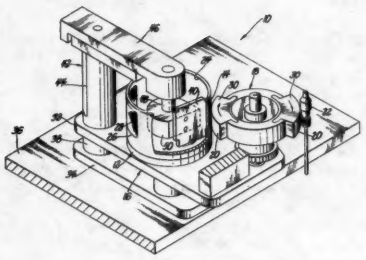
Richard W. Duce, Clio, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed Aug. 24, 1988, Ser. No. 235,419
Int. Cl.[4] B41F *17/22*
U.S. Cl. 101—38.1 **6 Claims**

1. A rotary indirect printing assembly for printing objects to be sequentially cycled past said assembly, said assembly comprising; a printing drum presenting a printing surface, a platform defining a horizontal plane, said printing drum rotatably supported upon said platform,

a transfer roller presenting a transfer surface, said transfer roller rotatably supported upon said platform and rotating in time with said printing drum,

said printing surface of said drum and said transfer surface of said transfer roller being in tangential rotational contact with respect to each other to transfer an ink image from said printing surface to said transfer surface to transfer said image to an object as the object is sequentially cycled past the assembly,



said printing drum and said transfer roller being disposed vertically with respect to said horizontal plane of said platform,

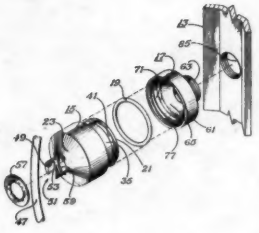
the improvement comprising said printing drum including an interior surface defining a hollow space interior of said printing surface and forming a cup for holding ink, said assembly including a squeegee vertically disposed and fixedly secured in a stationary position within said interior hollow space and projecting into the ink in said cup, said squeegee forcing the ink vertically up said interior surface of said printing drum to evenly distribute ink over said interior surface and forcing the ink through said drum to said transfer roller.

4,885,993

SHAPED CHARGE WITH BIFURCATED PROJECTION FOR DETONATING CORD

Michael P. Hancock, Cleburne, and Scott L. Hayes, Mansfield, both of Tex., assignors to Goex, Inc., Cleburne, Tex.

Continuation-in-part of Ser. No. 157,379, Feb. 17, 1988, Pat. No. 4,852,495. This application Sep. 29, 1988, Ser. No. 250,931
Int. Cl.[4] F42B *1/02*
U.S. Cl. 102—307 **6 Claims**



1. A shaped charge, comprising: p1 (a) a shaped charge case having first and second ends and a cavity therein, said case cavity opening up to said case first end, said case first end

having a cylindrical first surface that is circumferential, said first surface having a circumferential groove;

(b) a shaped charge cap having first and second ends and a cavity therein, said cap cavity opening up to said cap first end, said cap first end having a cylindrical second surface that is circumferential, said second surface having a circumferential groove, said cap second end being adapted to couple to a shaped charge carrier;

(c) elastomeric seal means fitted inside of said first surface groove;

(d) said first surface groove having a depth such that when said seal means is fitted into said first surface groove a portion of said seal means protrudes from said first surface;

(e) said case and said cap being assembled together to form an enclosed cavity from said case and cap cavities by one of said first ends matingly receiving the other of said first ends such that during assembly one of said first or second surfaces slides over the other of said first or second surfaces, the assembled case and cap forming a single cavity from said case cavity and said cap cavity, when said case and said cap are assembled together said first and second surfaces face one another and said first surface groove is aligned with said second surface groove, with said portion of said seal means that protrudes from the first surface being received by said cap groove;

(f) said seal means lies in a plane which is perpendicular to said first and second surfaces;

(g) said seal means retains said cap and said case together while allowing said case to rotate relative to said cap and while providing a circumferential seal between said case and said cap;

(h) said cap second end is threaded so as to be adapted to screw into a threaded opening on a shaped charge carrier;

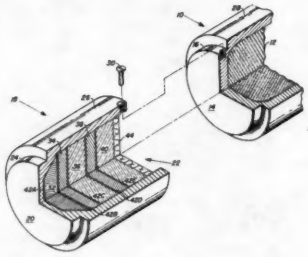
(i) said case second end has a projection means projecting from said second end, said projection means being bifurcated to form a slot for receiving a portion of a length of detonating cord, said projection means adapted to receive retaining means for retaining said detonating cord in said slot.

4,885,994

ARMOR PENETRATION RESISTANCE ENHANCEMENT

Marvin E. Backman; Stephen A. Finnegan, both of Ridgecrest; Kent G. Whitman, Inyokern, and Robert G. S. Sewell, Ridgecrest, all of Calif., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed May 16, 1983, Ser. No. 494,839
Int. Cl.[4] F42B *13/48*
U.S. Cl. 102—473 **10 Claims**



1. A construction to enhance the survivability of a guided missile warhead against mechanical countermeasures, which comprises:

a cylindrical metal armoring cup having an open aft end and a closed forward end which forms a forward bulkhead;

a ceramic layer inserted into said cup, said ceramic layer dimensioned to fit snugly into said cup and to abut said forward bulkhead;

a metal plate inserted into said cup, said metal plate dimensioned to fit snugly into said cup and to abut said ceramic layer;

a layer of polymethylmethacrylate inserted into said cup, said polymethylmethacrylate layer dimensioned to fit snugly into said cup and to abut said metal plate; and

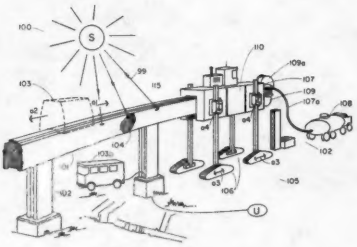
means for attaching said open aft end of said cup to the end of said warhead which is to be oriented toward a target at which said warhead is to be launched.

4,885,995

SOLAR INDUCTION MONORAIL SYSTEM AND METHOD OF USING

Mark J. Antosh, 4009 N. Stone Ave., Tucson, Ariz. 85705

Filed Mar. 28, 1988, Ser. No. 174,422
Int. Cl.[4] B60L *13/02*
U.S. Cl. 104—118 **20 Claims**



1. A solar energy induction monorail system, said monorail system comprising:

(a) a monorail structure fabrication means for fabricating a solar energy induction monorail structure;

(b) a solar energy collecting monorail structure means for collecting solar energy and converting said solar energy into electrical energy for use by said monorail system; and

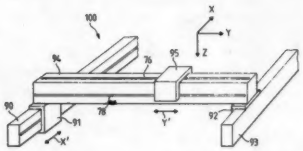
(c) a transit vehicle means for being propelled along said monorail structure means and adapted electro-magnetically and mechanically for using said electrical energy.

4,885,996

APPARATUS FOR HANDLING AN ASSEMBLY SYSTEM HAVING A CARRIER MEMBER AND A SLIDE UNIT

Gregory C. Hirschmann, Rautistrasse 12, Zurich, Switzerland

Filed Aug. 15, 1988, Ser. No. 232,628
Claims priority, application Switzerland, Aug. 27, 1987, 3320/87
Int. Cl.[4] B66C *11/16*
U.S. Cl. 104—134 **16 Claims**



1. Apparatus for a handling assembly system, comprising a carrier member formed as a guideway, and at least one slide unit linearly movable and adjustable thereon, said slide unit being operatively connected by means of a cable drag member with an energy and signal source, said slide unit being formed

as an attachment to the carrier member, the carrier member being formed by a one-piece rigid cellular structure formed of spaced base portions and side walls passing through the carrier along the length thereof and being limited by spaced-apart upper and lower side walls, said carrier member including a guideway for receiving the cable drag member passing through the entire length of the carrier member, a base connected to one side of the guideway for receiving a rack and guide members for mounting the slide unit, said guide members being arranged laterally on two lower side walls, and the slide unit including a casing for receiving a drive unit which is in operative connection with the rack, and a head for receiving the casing, said head being of U-shaped cross-section for substantially surrounding the casing and the carrier member and having two lateral legs displaceably mounted on the guide members of the carrier member.

4,885,997

POWER-AND-FREE CONVEYOR

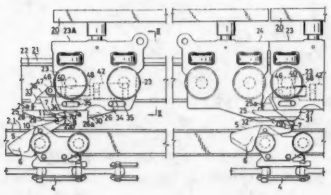
Takao Wakahayashi, Toyonaka, Japan, assignor to Nakanishi Metal Works Co., Ltd., Osaka, Japan

Division of Ser. No. 876,582, Jun. 20, 1986, Pat. No. 4,771,700. This application Jul. 13, 1988, Ser. No. 220,702

Claims priority, application Japan, Jul. 23, 1985, 60-163402; Nov. 25, 1985, 60-265481

Int. Cl.[4] B61B *13/00*

U.S. Cl. 104—172.3 **3 Claims**



1. A power-and-free conveyor, comprising a power line; a free line coextensive with the power line thereabove; a multiplicity of pivotally movable pushers adapted to travel with a drive chain of the power line; free trolleys attached to carriers on the free line; and shock absorber means for mitigating impact due to engagement of at least one of said pushers with one of said trolleys, wherein each of the trolleys comprises a main body and a slider mounted thereon and slidable longitudinally along the trolley, the slider being provided with an engaging dog and an anticoasting dog, the slider of each of said trolleys being connected to the main body by said shock absorber means, wherein at least one of said pushers moves therebetween said engaging dog and said anticoasting dog to thereby permit said shock absorber means to mitigate multidirectional impact.

4,885,998

PATIENT SUPPORT SYSTEM FOR RADIOTHERAPY

Francis J. Span; Leopold H. Hissel, both of Eindhoven, Netherlands, and Leonardus J. Grassens, Chipita Park, Colo., assignors to U.S. Philips Corporation, New York, N.Y.

Filed Mar. 15, 1988, Ser. No. 168,354

Claims priority, application United Kingdom, Mar. 16, 1987, 8706152

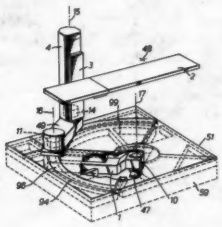
Int. Cl.[4] A47B *11/00*

U.S. Cl. 108—139 **14 Claims**

1. A patient support system for positioning a patient relative to an irradiation therapy or treatment simulation isocentre fixedly positioned relative to a treatment room floor comprising:

a structural support fixedly positioned with respect to said floor; a generally horizontally extended main supporting arm rotationally attached at one end to said structural support by a first support bearing, said first support bearing defining a first vertical axis about which said main supporting arm is rotatable;

a further generally horizontally extended supporting arm rotationally attached at one end to the other end of said main supporting arm by a second support bearing, said second support bearing defining a second vertical axis about which said further support arm is rotatable;



vertical support means rotationally attached to the other end of the further supporting arm by a third support bearing, said third support bearing defining a third vertical axis about which said vertical support means is rotatable;

supporting carrier means carried by said vertical support means for selective vertical displacement; and

first, second and third motor drives operatively coupled respectively with said first, second and third support bearings for respectively selectively rotating said patient support top about said first, second and third axes.

4,885,999

PULVERIZED COAL FIRING METHOD AND EQUIPMENT THEREFOR

Akira Baba; Kunio Okiura, both of Kure, and Naoki Fujiwara, Kawasaki, all of Japan, assignors to Babcock-Hitachi Kabushiki Kaisha, Tokyo, Japan

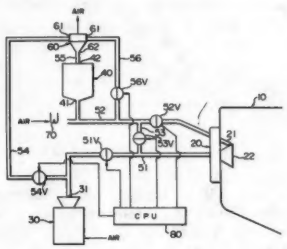
PCT No. PCT/JP87/00784, § 371 Date Apr. 20, 1988, § 102(e) Date Apr. 20, 1988, PCT Pub. No. WO88/02833, PCT Pub. Date Apr. 21, 1988

PCT Filed Oct. 15, 1987, Ser. No. 188,390

Claims priority, application Japan, Oct. 18, 1986, 61-248101

Int. Cl.[4] F23N *5/18*

U.S. Cl. 110—186 **11 Claims**



2. A pulverized coal firing equipment comprising:

a burner means;

pulverized coal supply means for feeding pulverized coal to said burner means, said pulverized coal supply means including a mill means for grinding coal, and pulverized coal feed line means for connecting said mill means to said burner means;

return line means branching from the pulverized coal supply means, through which the pulverized coal is circulated,

said mill means being arranged midway in said return line means; and

switching means for opening or closing the pulverized coal supply means and for opening or closing the return line means.

4,886,000

METHOD OF TREATING WASTE

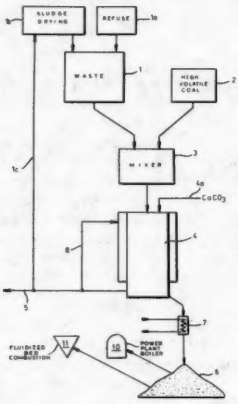
Heinz Hölter, Beisenstr. 39-41, 4390 Gladbeck; Heinrich Igelbüscher, Gladbeck; Heinrich Gresch, Dortmund, and Heribert Dewert, Gladbeck, all of Fed. Rep. of Germany, assignors to Heinz Hölter, Gladbeck, Fed. Rep. of Germany

Continuation of Ser. No. 539,613, Oct. 6, 1983, abandoned. This application Mar. 7, 1985, Ser. No. 709,351

Claims priority, application Fed. Rep. of Germany, Oct. 9, 1982, 3237471; Nov. 20, 1982, 3242995

Int. Cl.[4] F23G *5/06*

U.S. Cl. 110—345 **6 Claims**



1. A method of producing a sanitarily storable combustion product which comprises the steps of mixing a waste selected from the group which consists of household garbage and refuse, clarifier sludge and mixtures thereof with a high volatiles coal having a volatiles content in excess of 28% to produce a mixture, degasifying said mixture at a temperature up to 650° C. to produce a coke-like product having a volatiles content of at least 10%, sanitarily storing the coke-like product without health risk for a period of the order of months, and after said storage period burning said coke-like product to produce useable heat therefrom.

4,886,001

METHOD AND APPARATUS FOR PLASMA PYROLYSIS OF LIQUID WASTE

Robert C. W. Chang, Wilkins Twp., Allegheny County; Steven C. Vondran, Hempfield Twp., Westmoreland County, Pa., and Michael F. Joseph, Monroeville, all of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Continuation of Ser. No. 229,884229, Aug. 8, 1988, abandoned. This application Apr. 14, 1989, Ser. No. 339,879

Int. Cl.[4] F23G *5/00*

U.S. Cl. 110—346 **18 Claims**

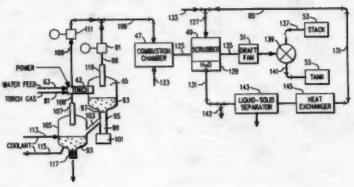
1. A method for pyrolytically decomposing waste material, including the steps of:

(a) producing a plasma by use of oxygen as the torch gas;

(b) atomizing waste material and a source of hydrogen and oxygen, then injecting the atomized waste material and source of hydrogen and oxygen into the plasma, having a temperature in excess of 5000° C., to form a mixture of product gases and solid particulate;

(c) separating the gases and particulate mixture in a recombination chamber into separate phases of gases and solid particulate;

(d) transferring the solid particulate to separate compartment and subjecting the particulate to a partial vacuum to



separate any carryover gases from the particulate which carryover gases are combined with the gases from the recombination chamber;

(e) transferring the gas from the recombination chamber to a scrubber and subjecting the gas to a water spray to eliminate any carryover solid particulate from the gases; and

(f) removing the scrubbed gases from the scrubber.

4,886,002

TRANSPLANTING MACHINE

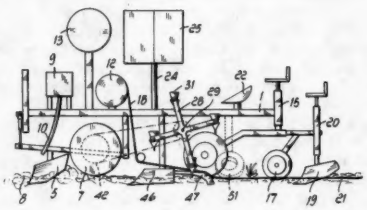
Loris Scudellaro, via Valli 36, 35020 Candiana (Prov. of Padova), Italy

Filed Oct. 26, 1987, Ser. No. 112,856

Claims priority, application Italy, Nov. 6, 1986, 41622 A/86

Int. Cl.[4] A01C *11/02*; A01B *49/04*

U.S. Cl. 111—102 **11 Claims**



1. Transplanting machine comprising a framework associable to a tractor and provided with support wheels and with seats for operators, further comprising a first section for the preparation of the soil, a second transplanting section and a third ridging section, said first section being provided with front ploughshares for the accumulation of the soil and with a presser roller, said second section having at least one motorized multiple-arm device pivoted to said framework along a horizontal axis, to each of its arms there being pivoted an openable cup, said cup being adapted to contain the plant to be transplanted and interacted with the soil, said framework including a cam control, said cup being furthermore operated by said cam control, at least when interacting with said soil, said third section being provided with ridging means, said multiple-arm device of said second section being motorized by a variable-ratio transmission driven by said presser roller, wherein said cups are freely mounted oscillating at the end of said arms so that they remain vertical due to gravity.

4,886,003

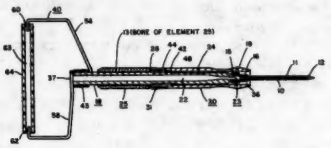
EMBROIDERING TOOL

William H. Walker, 3227 Forrest Ave., Gadsden, Ala. 35905

Filed Feb. 13, 1989, Ser. No. 309,807

Int. Cl.[4] P05C *15/06*

U.S. Cl. 112—80.03 **21 Claims**



1. An embroidering tool comprising:

first, second, third, and fourth longitudinal and generally cylindrical elements coaxially arranged and each with a longitudinal bore-like cavity extending therethrough;

said first and second elements threadably engagable with each other with said second element comprising a hypodermic type needle and a threaded needle hub with said hypodermic type needle having its proximate end secured in the bore of said needle hub and with said threaded needle hub threadably engagable with a threaded first end of said first element;

said third element coaxially surrounding a portion of said first element and being threaded on its inner and outer surfaces beginning at a radially compressible first end thereof to allow compression of said third element against said first element to lock said third element against said first element to prevent relative movement between said first and third elements; and

said fourth element coaxially surrounding portions of said first element, said third element, said needle, and said needle hub and threadably engagable with said third element from said first end of said third element and further having its bore-like cavity configured to compress the radially compressible first end of said third element against said first element to prevent movement therebetween when said fourth element is threadably engaged with said third element to a predetermined point on said third element;

the longitudinal position of said third element with respect to said first element determining the am,amount of extension of said needle out of said fourth element when said fourth element is threadably engaged with said third element by said predetermined distance.

4,886,004

NEEDLE THREAD TENSION CONTROL INCLUDING SEPARATE STOPPING AND ADJUSTABLE PRE-TENSION DEVICES

Masao Ogawa, Nagoya, and Toshio Sasaki, Inazawa, both of Japan, assignors to Brother Kogyo Kabushiki Kaisha, Aichi, Japan

Filed May 16, 1988, Ser. No. 194,317

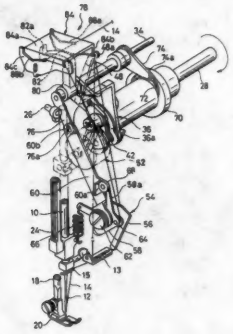
Claims priority, application Japan, May 15, 1987, 62-119464; May 15, 1987, 62-119465

Int. Cl.[4] D05B *47/04*

U.S. Cl. 112—254 **5 Claims**

1. A needle thread tension control including separate stopping and adjustable pre-tension exerting devices in combination with a sewing maching having an endwise reciprocatory needle with an eye; a needle thread supply source including a spool supplying needle thread; a bobbin for supplying bobbin thread; a take-up member movable between a maximum thread slack position and a maximum thread take-up position, a feed member for imparting a feed motion to a work fabric in timed relation with the reciprocation of said needle; thread supply stopping means for checking, at least during said maximum thread take-up position of said take-up member, supply of the needle thread supplied from said needle thread supply source in a predetermined timed relationship in synchronism with the feed motion of said feed member; and a needle thread supply path extending from said needle thread supply source via said thread supply stopping means to the eye of said needle;

said adjustable pre-tension exerting device comprising:



tension adjusting means for exerting a tension on the needle thread between said supply source and said thread supply stopping means, said tension adjusting means including means for adjusting said tension to be a predetermined value equal to or lower than a tension of the bobbin thread.

4,886,005

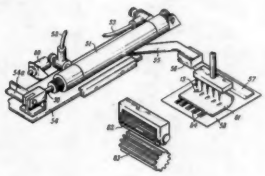
THREAD UNDERCUT ATTACHMENT FOR A MULTI-NEEDLE SEWING MACHINE

Gene Burton, Jr., Healdton, Okla., assignor to Atlanta Attachment Company, Lawrenceville, Ga.

Filed Dec. 3, 1987, Ser. No. 128,426

Int. Cl.[4] D05B *27/14, 65/02*

U.S. Cl. 112—292 **20 Claims**



1. An attachment for a multi-needle sewing machine of the type for forming parallel stitches in a work product including a thread supply, a plurality of reciprocable needles and loopers receiving threads from the thread supply, a throat plate, and a presser foot, said attachment comprising a continuous edge cutting member of a length sufficient to span the positions of all of the threads extending from the loopers and needles of the sewing machine to the work product for positioning in front of the needles of the multi-needle sewing machine and the workpiece to be fed to the needles of the sewing machine, cutting member moving means operably connected to said cutting member for moving said cutting member longitudinally from in front of the reciprocable needles of the sewing machine through the area beneath the needles and the presser foot and beneath the workpiece and above the throat plate and the loopers of the sewing machine, whereby when the sewing operation has terminated the work product is moved away from the needles and the cutting member moves into simulta-

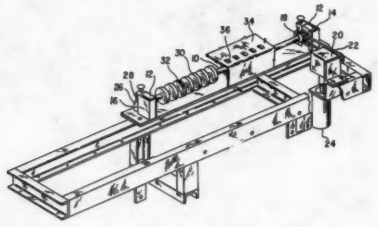
neous cutting contact with all of the threads extending through the workpiece from the needles and the threads extending from the workpiece to the loopers.

4,886,006

FABRIC EASING DRUM

Vaclav Jelinek, River Edge, N.J., assignor to SSMC Inc., Fairfield, N.J.

Filed Feb. 21, 1989, Ser. No. 313,208
Int. Cl.[4] D05B *27/16*
U.S. Cl. 112—313 10 Claims



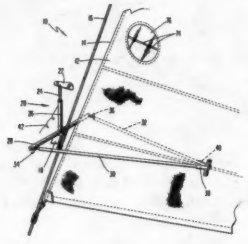
1. A fabric easing drum comprising:
an elongated horizontal shaft having an elongated horizontal axis about which said shaft is rotatable;
a plurality of like circular discs secured at their centers to said shaft and rotatable therewith, said discs being spaced apart and lying in parallel vertical planes, each disc having an external periphery covered with a high friction coating; and
driving means coupled to said shaft to rotate same about the axis.

4,886,007

SERVOMECHANISM FOR SAILBOATS

Robert L. Wheeler, 823-A E. Gulf Blvd., Indian Rocks Beach, Fla. 34635

Filed Jul. 27, 1988, Ser. No. 224,644
Int. Cl.[4] B63H *9/10*
U.S. Cl. 114—102 22 Claims



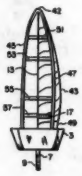
16. An apparatus that substantially maintains a preselected angular orientation of a sail on a sailboat, comprising:
a sail;
a first flexible line connected to a first side of said sail;
a second flexible line connected to a second side of said sail;
a first part of said first flexible line being disposed transverse to a longitudinal axis of symmetry of said sailboat;
a first part of said second flexible line being disposed transverse to a longitudinal axis of symmetry of said sailboat;
said respective first parts of said first and second flexible lines extending in opposite directions from said sail;
a second part of said first flexible line being disposed parallel to said longitudinal axis of symmetry of said sailboat;
a second part of said second flexible line being disposed parallel to said longitudinal axis of symmetry of said sailboat;
a pair of line mounting means for securing trailing ends of said first and second lines;
said first and second lines operative to control the angular orientation of said sail;
said sail having a first preselected position determined by an operator of said sailboat;
a wind vane means;
said wind vane means and said sail defining an initial relative angle therebetween when said sail is in its first preselected position;
a motor means electrically connected to said wind vane means;
said motor means being activated when the initial relative angle between said wind vane means and said sail is changed to a different relative angle;
said motor means being operably connected to said first and second lines that control the angular orientation of the sail;
feedback means connected between said sail and said wind vane means;
said motor means being deactivated when said feedback means indicates to said motor means that the initial relative angle between the sail and wind vane means has been restored by the operation of said motor means.

4,886,008

FRAME SPAR FOR SOFT AIRFOILS

Lawrence J. Puckett, 3106 Whitefield Rd., Churchville, Md. 21028

Filed Feb. 11, 1988, Ser. No. 154,838
Int. Cl.[4] B63H *9/06*
U.S. Cl. 114—102 4 Claims



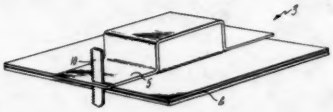
1. A sailboat comprising a mast which comprises an A-frame mounted athwartships with its plane perpendicular to that of the sailboat's keel, said A-frame comprising port and starboard legs which converge to form an apex directly above the plane of said keel, the legs of said A-frame being connected with one or more rigid horizontal spreaders, one of said spreaders has a track along the forward edge thereof; said A-frame being provided with a headstay and a backstay, a mainstay running from said apex vertically downward to the deck of said sailboat, a boom pivotally attached to the aft side of the lowermost of said spreaders to permit athwartship adjustments of the boom; a mainsail having its luff attached to said mainstay, its halyard supported near the said apex, its foot attached to said boom, said sailboat is rigged with a spinnaker which has the inboard end of its spinnaker pole attached to the forward side of said A-frame, and the inboard end of said spinnaker pole is adapted to slide in said track of a spreader and to be locked therein in any desired position.

4,886,009

COMPOSITE TOOL HAVING WEAR INDICATOR

Robert K. Gondar, Monroe, and Philip J. Jacobs, Northford, both of Conn., assignors to United Technologies Corporation, Hartford, Conn.

Filed Jun. 27, 1988, Ser. No. 211,949
Int. Cl.[4] G01N 3/56; B24B 55/00
U.S. Cl. 116—208 8 Claims



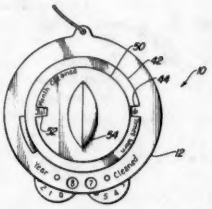
1. A tool particularly adapted for forming of a composite material shape comprising a composite guide tool having a guide edge that is subject to abrasion from a cutting means, said tool containing at least one wear groove in at least one of said guide edges that is subjected to said abrasion, said wear groove of a desired length and of a predetermined depth.

4,886,010

CLOTHING WEAR MONITORING DEVICE

Ralph Stutzman, 5025 Knollcrest Ct., Indianapolis, Ind. 46208

Filed Sep. 22, 1988, Ser. No. 247,913
Int. Cl.[4] G09F 9/40, 3/14
U.S. Cl. 116—308 15 Claims



14. The garment wear monitor for recording the number of times a garment is worn comprising:

a disc shaped plate means having a numerical scale thereon;

a first indicator means disposed adjacent to said plate means for indicating on said numerical scale the number of times said garment has been worn, said first indicator means comprising a rotatable disc having a window portion adjacent to said numerical scale which reveals a single number on said numerical scale, and a month scale displaying each month of the year, said month scale having an opening adjacent to each month;

a second indicator means having a date scale thereon;

(a) said second indicator means disposed adjacent to said disc shaped plate means for indicating on said date scale the date on which said garment was cleaned;

a threshold indicator means for identifying the portion of said numerical scale which corresponds to a predetermined number or numbers, whereby the user of said garment will be reminded that said garment has been worn a predetermined number of times;

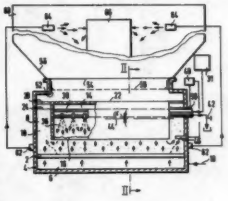
a third indicator means disposed adjacent to said first indicator means, said third indicator means having a window for permitting a single one of the months on said first indicator means to be viewed, and also having a handle means for permitting said third indicator means to be manually rotated, and having a peg disposed into one of said holes adjacent to said months on said first indicator means, wherein said month visible in said window on said third indicator means may be changed by manually pulling said third indicator means by said handle until said peg is withdrawn from said hole permitting said third indicator means to rotate with respect to said first indicator means; and means for removably affixing said garment wear monitor to a position in proximity of said garment.

4,886,011

POWDER COATING APPARATUS

Silvano Gelain, St. Gall, Switzerland, assignor to Ransburg-Gema AG, Switzerland

Continuation of Ser. No. 6,952, Jan. 27, 1987. This application Jul. 14, 1988, Ser. No. 219,813
Claims priority, application Fed. Rep. of Germany, Jan. 28, 1986, 3602388
Int. Cl.[4] B05C 5/00
U.S. Cl. 118—308 16 Claims



1. A powder coating apparatus, comprising:

a powder container for holding powder to be fluidized, the container having a perforated bottom;

means, coupled to the bottom of the powder container, for fluidizing the powder in the powder container;

apparatus for feeding a flowable additional substance into the fluidized coating powder, the apparatus including:

at least one bell disposed in the powder container, the at least one bell having the shape of a closed vessel except for one side thereof which is substantially open to define a contiguous lower opening, the at least one bell being at least partially disposed in the powder container with the lower opening thereof facing the bottom of the container and deep enough therein to be immersed in powder in the container to create an air pocket in the at least one bell whereby the air pocket within the at least one bell is effective for preventing powder from entering into the bell and for maintaining the level of any powder entering the bell lower than the level of the powder outside the bell;

means for supplying the additional substance under pressure;

a feeding device located in the at least one bell, in the air pocket thereof and therefore above the level of powder in the bell, for feeding the additional substsance from the supplying means into the air pocket in the at least one bell to enable the additional substance to leave the bell through the lower opening therein and to enter into the fluidized coating powder for mixing therewith.

4,886,012

SPIN COATING APPARATUS

Masahiko Ikeno; Hiroshi Kawashima, and Osamu Kaneda, all of Itami, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Japan

Filed Jun. 27, 1988, Ser. No. 212,229
Claims priority, application Japan, Jun. 30, 1987, 62-164346; Oct. 6, 1987, 62-253331; Nov. 17, 1987, 62-291351
Int. Cl.[4] B05C 1/02
U.S. Cl. 118—667 8 Claims

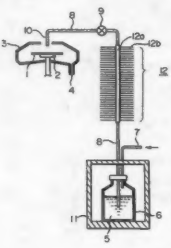
1. A spin coating apparatus comprising:

means for rotating a substrate in the plane of the substrate;

dispensing means for dispensing a coating liquid onto the substrate;

a reservoir for a thermosetting coating liquid for application to the substrate;

refrigeration means for maintaining said reservoir and the thermosetting coating liquid at a temperature below the temperature of the substrate and the setting temperature of the thermosetting coating liquid;



means for transporting the thermosetting coating liquid from said reservoir to said dispensing means; and

heating means for heating the thermosetting coating liquid during transportation to said dispensing means to the temperature of the substrate before the thermosetting coating liquid is dispensed by said dispensing means onto the substrate.

4,886,013

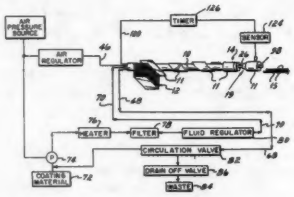
MODULAR CAN COATING APPARATUS

James J. Turner, Amherst; Guy H. McMillan, Elyria, both of Ohio; Joseph A. E. Pintelon, Lennik, Belgium; Joseph C. Waryu; James L. Kennon, both of Amherst, Ohio, and Peter E. Muller, Aesch, Switzerland, assignors to Nordson Corporation, Westlake, Ohio

Filed Jan. 12, 1989, Ser. No. 296,438

Int. Cl.[4] B05C *1/02, 7/02*

U.S. Cl. 118—668 **11 Claims**



1. Coating apparatus for applying a stripe of fluid coating material over the longitudinal seams of a series of spaced can bodies moving along a can forming line, said coating apparatus being adapted to fit within the interior of said can bodies and comprising:

a fluid manifold module communicating at its upstream end with sources of air and fluid coating material under pressure and having an air flow passageway and a fluid flow passageway extending along its length for flow of air and fluid coating material, respectively, to its downstream end;

a coating module mounted to said downstream end of said fluid module and communicating with at least said fluid flow passageway;

pneumatically operable valve means in said coating module selectively movable to a valve open and a valve closed position for permitting the flow of said fluid coating material in said valve open position through said fluid flow passageway for discharge onto said seams of said can bodies; and

a solenoid valve mounted in said fluid manifold module in communication with said air flow passageway to control the flow of air through said air flow passage to selectively open and close said valve means.

4,886,014

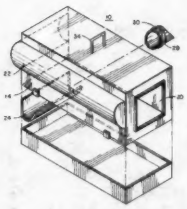
PET LITTER BOX

David G. Sheriff, 49 Ogden La., Rockledge, Fla. 32955

Filed Aug. 24, 1988, Ser. No. 235,615

Int. Cl.[4] A01K *29/00*

U.S. Cl. 119—1 **7 Claims**



1. An animal litter box comprising:

a generally rectangular container having an inperforate bottom adapted to receive and contain absorbent animal litter material and excrement thereon, a top, and four side walls extending from the bottom to the top of said container, one of said side walls having an opening therein to permit ingress and egress of an animal;

a perforate, trough-shaped wire mesh separator attached to a side wall opposite said side wall having an opening therein;

an opening in and a tube-shaped protrusion extending from a side wall adjacent said side wall having a wire mesh separator attached thereto, said opening and tube-shaped protrusion being aligned with said wire mesh separator; and

a disposable bag removably attached to said tube-shaped protrusion for the temporary storage of animal excrement.

4,886,015

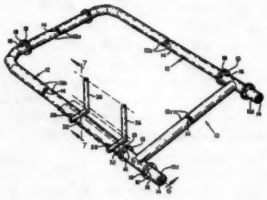
MODULAR FLOTATION SUPPORT COLLAR ASSEMBLY FOR AQUACULTURE FISH PEN

Gordon M. Ochs, 5001 P St., Washougal, Wash. 98671

Filed Apr. 1, 1988, Ser. No. 176,604

Int. Cl.[4] A01K *63/00*

U.S. Cl. 119—3 **12 Claims**



11. A method of modular flotation collar assembly comprising:

(a) providing elongate tubular segments having open ends defining central longitudinal axis at each of said ends;

(b) sealing the ends of said tubular segments with planar

bulkhead flanges extending substantially transverse to said central longitudinal axes, said flanges including portions which extend peripherally from said tubular segments; and

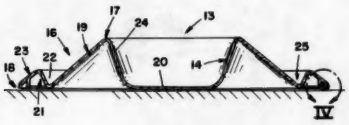
(c) interconnecting said tubular segments flange-to-flange in a desired configuration by interconnecting said peripherally extending portions of said flanges.

4,886,016

SPILL RESISTANT ANIMAL FEEDING DISH

Frank W. Atchley, 3006 Silverado Trail, Napa, Calif. 94558

Filed Jun. 16, 1987, Ser. No. 62,574
Int. Cl.[4] A01K *5/01*
U.S. Cl. 119—61 **3 Claims**



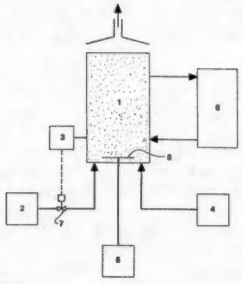
1. An animal feeding dish, including bowl means for retaining comestible substances to be consumed by an animal, a moat portion extending entirely about said bowl means to catch and retain spills from said bowl means, ground-engaging means disposed outwardly of said bowl means to form a supporting base substantially wider than said bowl means, said dish being formed of a continuous web of molded plastic material, said plastic material comprising a mixture of polyethylene, silicone, and paraffin, said silicone comprising up to 10% by weight of said plastic material and said paraffin comprising up to 10% by weight of said plastic material.

4,886,017

BOILERS WITH CATALYTIC COMBUSTION OF METHANE FOR HEATING WATER FOR DOMESTIC USE

Umberto Viani, Via Duilio, 8, Milano, Italy

Filed Jul. 20, 1987, Ser. No. 75,723
Claims priority, application Italy, Aug. 7, 1986, 21438 A/86
Int. Cl.[4] F22B *1/00*
U.S. Cl. 122—4 D **14 Claims**



1. A boiler for heating water for domestic use, comprising a catalyst container, a catalyst positioned in said catalyst container, means for introducing methane and oxygen into said container, a combustion triggering means for raising the temperature of said catalyst to a value at which said methane reacts with said oxygen in the presence of said catalyst, thereby initiating combustion of said methane to produce combustion products, heat transfer means for effecting heat transfer between said combustion products and said water, and a control system for controlling a temperature of combustion in said container, said control system comprising at least one thermocouple positioned in said catalyst and connected to a methane gas feed shut-off system,

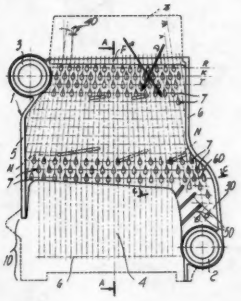
said catalyst consisting of one or more metals of the platinum group supported on a granular solid, the metal content of the catalyst being between 0.01% and 1% by weight of the total.

4,886,018

BOILER ELEMENT

Paolo Ferroli, San Bonifacio, Italy, assignor to Paolo Ferroli, San Bonifacio VR, Italy

Continuation-in-part of Ser. No. 943,115, Dec. 17, 1986, abandoned. This application Nov. 14, 1988, Ser. No. 270,900
Claims priority, application Italy, Dec. 23, 1985, 63409/85[U]
Int. Cl.[4] F22B *23/06, 37/10*
U.S. Cl. 122—367 C **4 Claims**



1. A boiler element of cast iron comprising:

a first and a second opposite faces, said first and second faces having respective outer sides and inner sides,

an inner cavity defined by said inner sides of said opposite faces,

deflector in said cavity to suitably guide a water flow therein,

an extension arm which is at least partially hollow and in fluid communication with said inner cavity,

a water inlet in said extension arm,

a water outlet located away from said water inlet and in fluid communication with said inner cavity,

peripheral ribs protruding from said outer sides of said opposite faces,

a plurality of fins protruding from at least one of said outer sides of said opposite faces and extending for a length equal or slightly lesser than said peripheral ribs,

said ribs being adapted to sealingly abut against corresponding ribs of at least one adjacent boiler element,

each of said fins having a base connected to a respective of said outer side of said face and a free end,

said free end being counterposed to a free end of a fin of an adjacent boiler element,

said free end having two top flat surfaces, a first of said surfaces extending substantially parallel to said respective face, a second of said surfaces being at an angle with respect to said first surface,

said first surface being counterposed to a first surface of said counterposed free end of said fin of said adjacent element,

said second surface being counterposed to a second surface of said free end of said fin of said adjacent element,

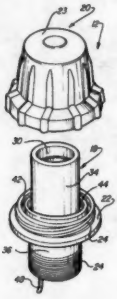
said first surface and said second surfaces respectively defining a neck passage and a widened passage adapted to suitably guide the gases.

4,886,019

ENGINE BREATHER ASSEMBLY WITH OIL DRAIN BACK

Thomas L. Davis, Tulsa, and Roy A. Harper, Jr., Broken Arrow, both of Okla., assignors to Arrow Specialty Company, Tulsa, Okla.

Filed Nov. 14, 1988, Ser. No. 270,169
Int. Cl.[4] F01M *13/00*
U.S. Cl. 123—41.86 **17 Claims**



1. A breather assembly for an internal combustion engine to expel vapors from the engine, said breather assembly mounted to the engine, said breather assembly comprising:

a stem having an axial fluid passageway communicating with the engine and an annular outer flange;

a cap to said stem to form a baffled interior chamber communicating with said axial passage said cap connected to send annular flange;

vent means communicating with said interior chamber for expelling vapors from said chamber through said annular flange;

valve means disposed in said axial passageway of said stem, said valve means opening in response to the flow of vapors into said axial passageway; and

a drain back tube for returning condensed oil to the engine, said tube mounted in said stem to provide fluid communication between said axial passageway and the engine.

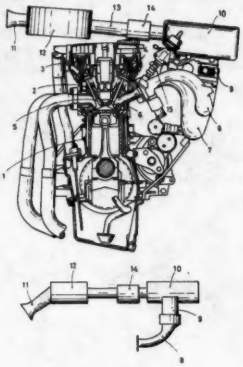
4,886,020

ENGINE INDUCTION SYSTEM

Rudolf Bitter, and Gunter Senff, both of Russelsheim, Fed. Rep. of Germany, assignors to General Motors Corporation, Detroit, Mich.

Filed Nov. 21, 1988, Ser. No. 274,247
Claims priority, application Fed. Rep. of Germany, Dec. 12, 1987, 8716461
Int. Cl.[4] F02B *27/02*
U.S. Cl. 123—52 M **4 Claims**

1. An internal combustion engine having an induction system with a plenum disposed upstream of intake runners, said plenum being connected in series with an upstream air filter and having a throttle body with a throttle valve to control intake air flow, characterized in that the throttle body (9)is



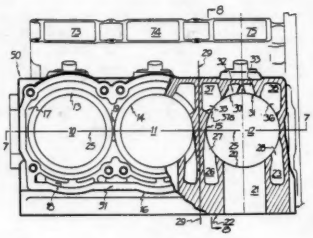
located directly at the outlet of the plenum (10) between the plenum (10) and a manifold including the intake runners (7, 8).

4,886,021

MULTI-CYLINDERED TWO STROKE CYCLE ENGINES

Kenneth P. Seeber, Wanneroo, and Christopher K. Schlunke, Kingsley, both of Australia, assignors to Orbital Engine Company Proprietary Limited, Balcatta, Wertern, Australia

Filed Feb. 23, 1988, Ser. No. 158,722
Claims priority, application Australia, Feb. 25, 1987, PI0523
Int. Cl.[4] F02B *33/04*
U.S. Cl. 123—73 PP **10 Claims**



1. A multi-cylinder engine block for an internal combustion engine operating on the two-stroke cycle and having two or more adjacent cylinder bores on said block with the axes of the bores parallel and in a common longitudinal plane, each cylinder bore having a respective exhaust port, an exhaust passage extending from each exhaust port to an external surface of the block with a portion of the exhaust passage adjacent the exhaust port extending in a direction generally at right angles to said common longitudinal plane, two first transfer ports in a portion of the block between the exhaust passages of each two adjacent cylinder bores and on the same side of the common longitudinal plane as the exhaust ports, each first transfer port communicating with a respective one of said two adjacent bores, each first transfer port communicating with a respective first transfer passage formed in said portion of the block between the exhaust passages, the first transfer port and associated first transfer passage of each of said two adjacent bores being located on opposite sides of a transverse plane substantially at right angles to said common longitudinal plane and midway between the axes of said two adjacent cylinder bores,

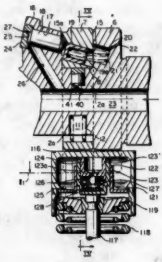
said first transfer ports and first transfer passages being configured and located so the axes of the two adjacent cylinder bores are spaced apart not more than about 1.22 times the diameter of the cylinder bores.

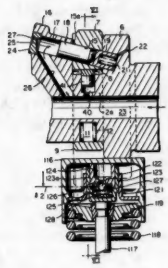
4,886,022

ENGINE VALVE DRIVING APPARATUS

Eiji Nakai, Yokohama, Japan, assignor to Mazda Motor Corporation, Hiroshima, Japan

Filed Jan. 3, 1989, Ser. No. 292,949
Claims priority, application Japan, Jan. 6, 1988, 63-332
Int. Cl.[4] F01L *1/34, 1/04*
U.S. Cl. 123—90.17 10 Claims





1. An engine valve driving apparatus for internal combustion engine comprising,

a camshaft rotatable in synchronism with rotation of an engine crankshaft,

a first cam member fixed on said camshaft,

a second cam member supported by said camshaft for radial movement between a projected and a retracted position;

both cam members defining holes whose axes coincide with each other when the second cam member is held at its projected position,

a connecting pin disposed in one of said holes for moving the second cam member radially outwardly by shifting from the hole in which it is disposed toward the other holes, and

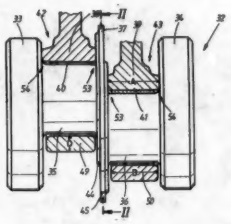
oil supply means for supplying oil to shift said connecting pin to move the second cam member radially outwardly to its projected position.

4,886,023

CRANKSHAFT DRIVE OF AN INTERNAL-COMBUSTION ENGINE OF V-TYPE

Johannes Werner, Waiblingen; Walter Kerschbaum, Fellbach, and Rolf Heinrich, Weinstadt, all of Fed. Rep. of Germany, assignors to Mercedes-Benz AG, Stuttgart, Fed. Rep. of Germany

Filed Aug. 22, 1988, Ser. No. 234,919
Claims priority, application Fed. Rep. of Germany, Aug. 22, 1987, 3728013
Int. Cl.[4] F02B *75/32*
U.S. Cl. 123—197 AC 9 Claims



1. Crankshaft drive of an internal-combustion engine of V-type with a crankshaft, which has two mutually offset crank pins between two crankshaft webs in each case, on each of which pins a connecting rod is mounted at a connecting rod connection by its large connecting rod eye having a width A, each of the connection rod connections including a bearing cover having a width B and a predetermined density and depth, each connecting rod being axially guided on a first side by a crankshaft web and on a second side via an axial stop surface arranged on the rod shank-sided part of the large connecting rod eye adjacent a non-lateral-load-bearing intermediate web which interconnects the two crank pins and has a cross-sectional area which is greater than overlapping cross-sectional areas of the two crank pins, wherein the intermediate web has an axial stop collar on either side, and wherein the intermediate web is of an enlarged design such that in each crankshaft position the cross-sectional area of the intermediate web extends over the axial stop surface of the respective connecting rod and wherein the difference of widths A and B times the predetermined depth and density of the bearing covers equals approximately the added weight of the intermediate web for the respective crankshaft throw.

4,886,024

ROTARY PISTON ENGINE

Harold M. Meredith, 841 N. Homer Rd., Midland, Mich. 48640

Continuation-in-part of Ser. No. 878,111, Jun. 24, 1986, abandoned. This application May 31, 1988, Ser. No. 200,570
Int. Cl.[4] F02B *53/04*
U.S. Cl. 123—234 18 Claims

1. A rotary piston internal combustion engine driven by a combustible gas, comprising:

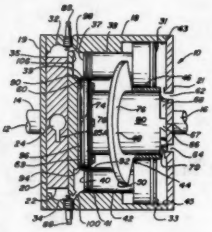
a housing having a forward end, a rearward end, and an inner cylindrical surface located at said forward end;

a main shaft bearingly attached to said housing, said main shaft having an axis of rotation concentric with said inner cylindrical surface;

a rotor disc element eccentrically attached to said main shaft, said rotor disc element having its center off set from said axis of rotation and having a peripheral surface, a predetermined portion of said peripheral surface sealingly engaging said inner cylindrical surface of said housing;

at least one first cavity formed in said predetermined portion of said peripheral surface of said rotor disc element, said at least one first cavity forming a first portion of a combustion chamber;

at least one second cavity formed in said inner cylindrical surface of said housing, said at least one second cavity forming a second portion of said combustion chamber, said at least one first cavity and said at least one second cavity periodically aligning with each other as said rotor disc element rotates to form said combustion chamber in at least one predetermined location during each complete rotation of said rotor disc element;



means for transferring said combustible gas upon formation of said combustion chamber to generate a force to said rotor disc element;

means for venting said combustible gas after said combustible gas has undergone combustion; said means for venting being located in said housing a predetermined distance from said at least one second cavity; and

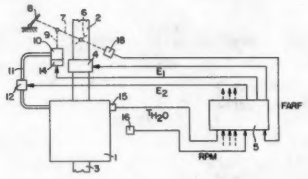
means for synchronizing said means for transferring, combusting, and venting so that said rotor disc element will rotate.

4,886,025

IDLING SPEED CONTROL SYSTEM FOR AN ELECTRONIC-INJECTION INTERNAL COMBUSTION ENGINE

Silverio Bonfiglioli, Zola Predosa; Gianni Fargnoli, Anzola Emilia, and Massimo Fato, Modena, all of Italy, assignors to Weber S.r.l., Turin, Italy

Filed Feb. 17, 1988, Ser. No. 156,840
Claims priority, application Italy, Feb. 17, 1987, 67105 A/87
Int. Cl.[4] F02D *33/02*; F02M *3/07*
U.S. Cl. 123—339 **15 Claims**



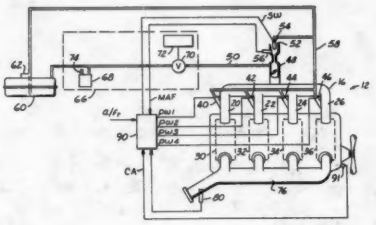
1. A system for controlling the idling speed of an internal combustion engine (1) featuring an electronic injection system, said engine (1) presenting an air supply valve (6), the minimum setting of which is controlled by at least a heat-sensitive element (10); characterized by the fact that it comprises electronic means (5) for detecting at least the speed of the said engine (1), the temperature of engine cooling water, and release of the accelerator pedal (8), for accordingly regulating the amount of heat supplied to the said heat-sensitive element (10) by said electronic means regulating at least one of the flow of cooling water and the amount of heat supplied by electrical means to said heat-sensitive element.

4,886,026

FUEL INJECTION CONTROL SYSTEM

Jeffrey A. Cook, Dearborn, Mich., assignor to Ford Motor Company, Dearborn, Mich.

Filed Sep. 1, 1988, Ser. No. 239,378
Int. Cl.[4] F02D *41/34*
U.S. Cl. 123—478 **5 Claims**



1. A fuel delivery control system for an internal combustion engine of an automobile having an intake manifold for inducting air and fuel into the combustion chambers and an exhaust manifold coupled to the exhaust chambers, comprising:

a plurality of primary fuel injectors each coupled to one of the combustion chambers for delivering fuel in proportion to the pulse width of a primary fuel control signal;

a secondary fuel injector coupled to the intake manifold upstream of said primary fuel injectors for delivering fuel in proportion to the pulse width of a secondary fuel control signal;

an airflow sensor coupled to said intake manifold for measuring airflow inducted into the engine;

an exhaust gas sensor coupled to said exhaust manifold for providing an indication of air/fuel ratio inducted into the engine;

fuel calculation means responsive to both said airflow sensor and said exhaust gas sensor for calculating a desired fuel charge related to a desired air/fuel ratio to be inducted into the engine;

first means responsive to said desired fuel charge for generating said primary fuel control signals each with a pulse width related to said desired fuel charge, each of said primary fuel control signals being generated once each engine revolution at a time related to the intake stroke of the respective combustion chamber;

second means responsive to said desired fuel charge for generating said secondary fuel control signal with a pulse width related to said desired fuel charge; and

selection means responsive to said desired fuel charge for enabling said primary fuel control signals and disabling said secondary fuel control signal when said desired fuel charge is above a preselected value and for disabling said primary fuel control signals and enabling said secondary fuel control signal when said desired fuel charge is below said preselected value.

4,886,027

FUEL INJECTION TEMPERATURE COMPENSATION SYSTEM

William B. Orrell, Sterling Heights, and Wendell D. Creps, Lake Orion, both of Mich., assignors to General Motors Corporation, Detroit, Mich.

Filed Jul. 29, 1988, Ser. No. 226,328
Int. Cl.[4] F02D *41/04*
U.S. Cl. 123—478 **4 Claims**

1. A fuel injection temperature compensation system for an internal combustion engine having combustion space into which air is drawn from the atmosphere through an intake manifold having a temperature varying in response to predetermined engine conditions in accord with a manifold tempera-

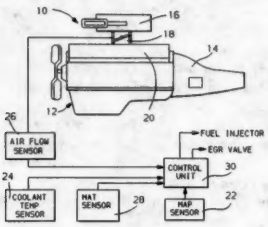
ture time constant that is dependent upon the value of the rate of air flow into the engine, the system comprising:

means for measuring the engine temperature;

means for measuring the atmospheric air temperature;

means for measuring the engine air flow rate;

means for predicting the steady state temperature of the air entering the combustion space as a predetermined function of the engine temperature, the atmospheric air temperature and the engine air flow rate;



means for determining the manifold temperature time constant corresponding to the measured engine air flow;

means for adjusting an actual temperature value toward the predicted steady state value in accord with the determined manifold temperature time constant; and

means for establishing an air-fuel ratio by calculating a base pulse width from the actual air charge temperature.

4,886,028

APPARATUS FOR CONTROLLING AIR-FUEL RATIO OF INTERNAL COMBUSTION ENGINE

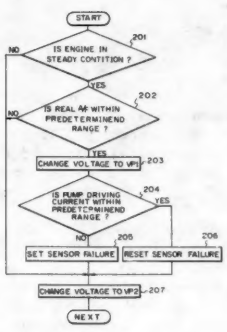
Masanobu Uchinami; Toshihisa Takahashi; Hiroyoshi Suzuki; Ryoji Nishiyama, and Shinichi Nishida, all of Hyogo, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Feb. 15, 1989, Ser. No. 310,571

Claims priority, application Japan, Feb. 26, 1988, 63-45133

Int. Cl.[4] F02D *41/14, 41/22*

U.S. Cl. 123—479 **2 Claims**



1. An air-fuel ratio control apparatus for an internal combustion engine, said apparatus including a wide range air-fuel ratio sensor, which includes an oxygen sensor section for generating a voltage in accordance with the difference between atmospheric pressure and the oxygen concentration of the engine exhaust gas and an oxygen pump section for flowing a pump-driving current so as to attain said voltage at a predetermined value, an air-fuel ratio detecting device for providing an air-fuel ratio detecting signal in response to said pump-driving current, and a control section for feedback-controlling a mixed gas generation means in accordance with said air-fuel ratio detecting signal to obtain an air-fuel ratio having a required value, said apparatus further comprising a deterioration detecting means for detecting any deterioration or failure of the wide range air-fuel ratio sensor by detecting that the pump-driving current is lower than a predetermined value when the pump-driving voltage for flowing the pump-driving current is set to a predetermined value lower than the ordinary pump-driving voltage while the engine is running in a steady conditon at which time the air-fuel ratio is within a predetermined range, and a feedback suspension means for stopping the feedback control of the air-fuel ratio when such deterioration or failure of the wide range air-fuel ratio sensor is detected.

4,886,029

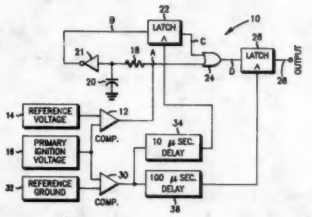
IGNITION MISFIRE DETECTOR

Mark P. Lill, Bensenville; Edward E. Li, Roselle, and Koushun Sun, Hoffman Estates, all of Ill., assignors to Motorola Inc., Schaumburg, Ill.

Filed May 26, 1988, Ser. No. 198,908

Int. Cl.[4] F02P *11/06;* **F02D** *41/22*

U.S. Cl. 123—479 **23 Claims**



1. A method of detecting misfire due to a fault in the secondary of an automotive ignition system that includes at least one ignition coil having a primary winding for developing a primary ignition signal, comprising:

sensing the ignition coil's primary ignition signal;

comparing the sensed signal to a reference signal; and

indicating a misfire condition when the compared primary ignition signal exhibits an abnormal relationship to the reference signal a first predetermined interval after the initiation of the primary ignition signal.

4,886,030

METHOD OF AND SYSTEM FOR CONTROLLING FUEL INJECTION RATE IN AN INTERNAL COMBUSTION ENGINE

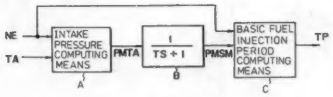
Hidehiro Oba, Aichi, and Senji Kato, Toyota, both of Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Aichi, Japan

Filed Feb. 26, 1988, Ser. No. 162,942

Claims priority, application Japan, Mar. 5, 1987, 62-51056

Int. Cl.[4] F02D *41/32, 43/00*

U.S. Cl. 123—488 **20 Claims**



1. A method of controlling fuel injection rate in an internal combustion engine, comprising the steps of:

(a) computing a certain intake pressure at a certain time by using a steady-state intake pressure defined by an amount

of actual throttle opening and actual engine rotational speed;

(b) computing a basic fuel injection period on the basis of the computed certain intake pressure and the actual engine rotational speed; and

(c) controlling the fuel injection rate in accordance with the computed basic fuel injection period.

4,886,031

DASHPOT WITH FILTER FOR FUEL TANKS

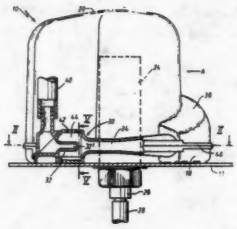
Dieter Scheurenbrand, Wolfschlugen, and Helmut Wawra, Korb, both of Fed. Rep. of Germany, assignors to Daimler-Benz Aktiengesellschaft, Stuttgart, Fed. Rep. of Germany

Filed Jun. 13, 1988, Ser. No. 206,112

Claims priority, application Fed. Rep. of Germany, Jun. 13, 1987, 3719809

Int. Cl.[4] F02M *39/00*; F11B *1/00*

U.S. Cl. 123—516 **6 Claims**



1. Dashpot for fuel tanks, which has a generally dome-shaped cover means, a guide channel means which tapers upwardly toward an opening in the dome-shaped cover means, said guide channel means having a jet pump in a base region receiving fuel flowing back from a fuel injection installation of an internal combustion engine, the jet pump being arranged at a periphery of the dashpot and having a pump channel means which opens approximately tangentially into the dashpot interior, a suction filter located in the dashpot interior and connected to a fuel output, filter being arranged spaced from and below the cover, and wherein the pump channel means directs any bubbles in the fuel from the jet pump into the dashpot interior where the bubbles will rise upwardly from the side channel toward the dome-shaped cover means and out the opening instead of through the suction filter.

4,886,032

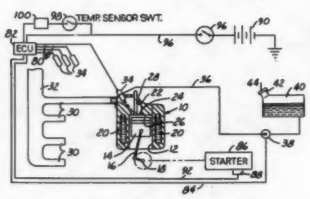
FUEL INJECTOR HEATING METHOD

Thomas W. Asmus, Oak Park, Mich., assignor to Chrysler Motors Corporation, Mich.

Filed Nov. 22, 1988, Ser. No. 274,550

Int. Cl.[4] F02M *39/00*

U.S. Cl. 123—559 **1 Claim**



1. In a vehicle internal combustion engine having a fuel injector with a valve opened and closed selectively by an electric coil actuator which is energized through an electrical circuit including a timer for producing a time limited injector heating mode to start a cold engine on a fuel having insufficient vapor pressure at the cold temperature to produce a fuel condition desirable for engine starting, comprising: sensing a cold engine condition; signalling the electrical circuit and specifically the timer to initiate the time limited heating mode specifically the timer to initiate the time limited heating mode which includes the following steps: deactivation of fuel delivery to the injector for a set period of time, deactivation of engine starting for the set period of time, continuous energization of the injector coil for the set period of time, whereby the injector coil and housing is significantly increased in temperature; terminating the injector heating mode of operation after the set period of time has expired and initiating a normal start and run mode of operation thereafter which consists of the following steps: activation of fuel delivery to the injector, termination of the continuous energization of the injector coil, activation of engine starting capacity, whereby fuel is delivered into the heated injector housing and instantly elevated in temperature so that it can be introduced into the engine for starting.

4,886,033

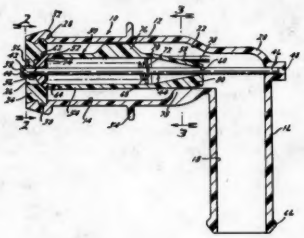
STABILIZED FLOW CONTROL VALVE

Joseph T. Betterton, Arab; Alfred H. Glover, Decatur; Thomas S. McKee, and Chris S. Romanczuk, both of Madison, all of Ala., assignors to Chrysler Motors Corporation, Highland Park, Mich.

Filed Aug. 29, 1988, Ser. No. 237,814

Int. Cl.[4] F02M *25/06*

U.S. Cl. 123—574 **2 Claims**



1. With an internal combustion engine, a crankcase gas flow control device located between the engine crankcase and the engine fuel-air induction, comprising:

a hollow housing with inlet and outlet and portions forming a passage for gas flow therebetween, a converging orifice passage in the flow direction between the inlet and outlet end portions;

an apertured member forming an inlet which is supported in the end of the inlet end portion of the housing and defining an inlet therethrough for gas passage;

a plurality of radially directed vanes in the inlet aperture to straighten gas flow entering the housing;

a rod extending through the housing coaxially with the inlet and the orifice passage;

a substantially hollow valve element slidably mounted about and axially movable along the rod;

a downstream end portion of the hollow valve element being progressively tapered and adapted for movement into the converging orifice as a pressure differential between the inlet and outlet end portions of the housing increases thereby controlling gas flow through the housing;

the hollow valve element having a plurality of vanes spaced about its circumference and extending axially therealong and radially outward whereby the gas flow along the exterior surface of the valve tends to follow a straight

axial path which stabilizes the valve and inhibits undesired oscillation thereof;

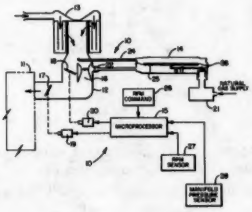
the housing interior and the converging orifice housing portion has a plurality of circumferentially spaced vanes located downstream from the inlet.

4,886,034

INTERNAL COMBUSTION ENGINE CONTROL SYSTEM

John E. Lambert, Dublin, Ohio, assignor to Gas Research Institute, Chicago, Ill.

Filed Mar. 30, 1989, Ser. No. 330,781
Int. Cl.[4] F02D *9/08*
U.S. Cl. 123—587 **9 Claims**



1. Internal combustion engine control system apparatus comprising:

(a) carburetor venturi means flowing basic combustion air and having an induced fuel flow in said basic combustion air;

(b) carburetor by-pass throttle valve means having a biased open position and causing and trimming the flow of supplementary combustion air parallel to and then into said basic combustion air for mixing;

(c) engine throttle valve means regulating the flow of a mixture of said supplementary combustion air and said basic combustion air with induced fuel flow for engine combustion;

(d) separate electrical step motor means connected to said carburetor by-pass throttle valve means and to said engine throttle valve means; and

(e) pre-programmed microprocessor means connected to each of said electrical stepmotor means,

said microprocessor means controlling one of said electrical stepmotor means and the trim positioning of said carburetor by-pass throttle valve means in response to sensed engine speed and sensed engine manifold pressure or throttle position conditions.

4,886,035

AIR-FUEL RATIO CONTROL METHOD FOR AN INTERNAL COMBUSTION ENGINE

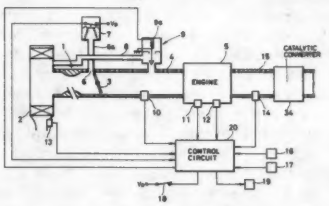
Norio Tomobe; Haruo Shimamura; Kozo Suzuki; Yutaka Taniguchi, and Yuji Fujiki, all of Wako, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 30, 1988, Ser. No. 175,470
Claims priority, application Japan, Mar. 31, 1987, 62-077985; Aug. 11, 1987, 62-200281; Dec. 1, 1987, 62-304117
Int. Cl.[4] F02M *23/10*
U.S. Cl. 123—588 **9 Claims**

1. In an air-fuel ratio control method for an internal combustion engine having a secondary intake air supplying passage communicating with an intake pipe downstream of a throttle valve in a carburetor of said internal combustion engine and a linear type flow regulating valve provided in said secondary intake air supplying passage; the improvement comprising the steps of:

detecting an engine temperature at starting of said internal combustion engine;

initiating to control said flow regulating valve to a controlled opening degree set correspondingly to said engine temperature when the detected engine temperature is greater than a predetermined temperature; and



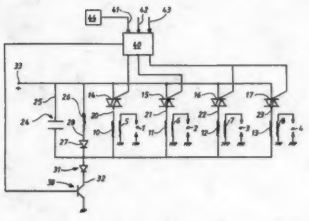
stopping the control of said flow regulating valve to said controlled opening degree when a control time period corresponding to the detected engine temperature is elapsed from the starting of said engine.

4,886,036

METHOD AND ARRANGEMENT FOR GENERATING IGNITION SPARKS IN AN INTERNAL COMBUSTION ENGINE

Sven H. Johansson, and Jan G. Nytomt, both of Åmål, Sweden, assignors to Saab-Scania Aktiebolag, Sweden

PCT No. PCT/SE87/00373, § 371 Date Apr. 21, 1988, § 102(e) Date Apr. 21, 1988, PCT Pub. No. WO88/01690, PCT Pub. Date Mar. 10, 1988
PCT Filed Aug. 25, 1987, Ser. No. 188,406
Claims priority, application Sweden, Sep. 5, 1986, 8603722
Int. Cl.[4] F02P *3/08*
U.S. Cl. 123—596 **15 Claims**



1. A method for generating ignition sparks in an internal combustion engine including an ignition system which comprises:

(a) an ignition coil with primary and secondary windings;

(b) at least one spark plug connected to receive ignition voltage from the secondary winding;

(c) an electrical energy source connected to the primary winding;

(d) an ignition capacitor;

(e) a charging circuit connected to the capacitor for charging said capacitor;

(f) a discharging circuit connected to the capacitor for discharging said capacitor;

(g) the discharging circuit comprising in series the primary winding of the ignition coil and a first, switchable circuit-breaking element; and

(h) the charging circuit including a second circuit-breaking element connected in series to the discharging circuit and also to earth;

(i) the first control signal being generated at a first time for switching on the first circuit-breaking element and triggering a discharging of the ignition capacitor via the discharging circuit, whereby there is produced in the

secondary winding a first ignition voltage corresponding to the first control signal;

(ii) the second control signal being generated at a second time, which occurs later than the first time but during the presence of the first control signal, for switching on the second circuit-breaking element, whereby the first and second circuit breaking elements are simultaneously kept conductive for current supply from the electrical energy source via the primary winding and the first and second circuit-breaking elements to earth;

(iii) the third control signal being generated at a third time, which occurs later than the second time, for switching to a nonconductive state at least one of the first and second circuit-breaking elements whereby the current supply via the primary winding is interrupted and a second ignition voltage is thereby produced in the secondary winding.

4,886,037

IGNITION SYSTEM FOR AN INTERNAL COMBUSTION ENGINE

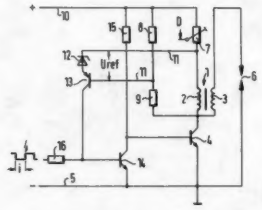
Richard Schleupen, Ingersheim, Fed. Rep. of Germany, assignor to Robert GmbH Bosch, Stuttgart, Fed. Rep. of Germany

Filed Mar. 17, 1987, Ser. No. 26,864

Claims priority, application Fed. Rep. of Germany, May 9, 1986, 3615548

Int. Cl.[4] F03P *3/04*

U.S. Cl. 123—645 **5 Claims**



1. Ignition system for an internal combustion (ICE) having an ignition coil (1, 2, 3);

a spark plug (6) connected across the secondary (3) of the ignition coil;

a switching transistor (4) connected serially with the primary (2) of the ignition coil;

a control switching element (14) coupled to the switching transistor and controlling current flow therethrough,

and comprising, in accordance with the invention,

an ignition coil charging current control circuit to provided for controlled rapid rise of current through the ignition coil, yet inhibiting an excessive rate of current rise which might induce a premature spark in the spark plug (6),

said ignition coil charging current control circuit including a bridge circuit (7, 8, 9, 2) of which the primary winding (2) of the ignition coil (1) forms one branch;

means (12, 13) for providing a reference voltage (Uref) coupled across a diagonal of the bridge circuit,

said reference voltage providing means being coupled to the control switching element (14) which controls current flow through the switching transistor (4) to define an optimal charge rate of current flow through the ignition coil.

4,886,038

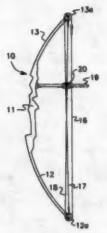
CABLE SLIDE GUIDE FOR COMPOUND BOWS

Gordon J. Betters, Zim Rd., Star Rte. 4, Box 154 A, Hibbing, Minn. 55746

Filed Dec. 29, 1987, Ser. No. 139,022

Int. Cl.[4] F41B *5/00*

U.S. Cl. 124—23 R **15 Claims**



1. In a compound bow including a handle portion having extensions thereof forming a pair of flexible bow limbs extending oppositely therefrom in a plane, each having a tip end, a plurality of pulleys rotatably mounted to the tip ends of the bow limbs, a bowstring cable extending between the pulleys, cable strands extending between the pulleys, a cable guard fixed to the handle portion and extending rearward therefrom next to and beyond the cable strands, the improvement comprising:

a slide guide member defining a first surface of slideably compatible shape with a surface of the cable guard and defining a second surface substantially opposite in direction from the first surface and containing at least one groove adapted to slideably receive the cable strands, the slide guide member being configured such that when interposed between the cable guard member and the first and second inner cable strands, said inner cable strands are laterally displaced and the first surface freely slideably abuts and engages the cable guard member in a manner that allows direct lateral removal and the second surface freely slideably receives the cable strands and wherein the slide guide member is held against the cable guard member solely by lateral force created by the displacement of said cable strands.

4,886,039

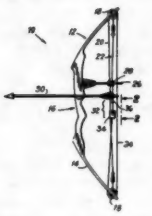
ARCHERY BOW LOCK DEVICE

John G. Wagner, Geldropsedijk 13, Nuenen 5672 AA, Netherlands

Filed May 7, 1987, Ser. No. 46,753

Int. Cl.[4] F41B *5/00*

U.S. Cl. 124—23 R **10 Claims**



1. A bow locking apparatus for use in conjunction with a compound archery bow having first and second cables connected to opposite ends of a draw string supported by and extending between opposite ends of bow limbs joined by a

rigid hand grip, comprising interlocking pawl and ratchet means mounted to said bow, at least one of said pawl and ratchet being movable with respect to the other, at least one of said pawl and ratchet means being affixed to at least one of said first and second cables for movement therewith, said ratchet means being adapted and arranged to engage and retain said pawl as the bow is drawn to a cocked position from the undrawn position whereby said first and second cables are immobilized to maintain said bow in the cocked position and to disengage said pawl for unrestricted cable return motion to the undrawn position when the bow is fired only as said bow is further drawn beyond said cocked position.

4,886,040

METHOD AND APPARATUS FOR REMOVING CONCRETE COATING FROM A PIPE

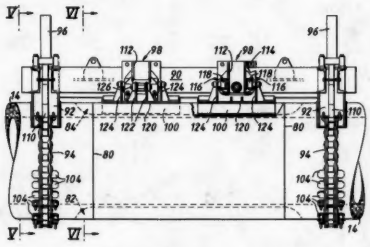
Nigel Wright, Northumberland, England, assignor to British Gas PLC, London, England

Filed Oct. 29, 1987, Ser. No. 114,191

Claims priority, application United Kingdom, Nov. 27, 1986, 8628386

Int. Cl.[4] B23D *1/32*

U.S. Cl. 125—23 R **1 Claim**



1. Apparatus adapted to remove a concrete coating from a length of pipe having two straight diametrically opposed slots which join two spaced circumferential slots thereby dividing the coating to be removed into two semi-cylindrical pieces of coating; the apparatus comprising a frame member, clamping means on said frame member to attach the frame to the pipe at a position along the pipe which is spaced from the position of the semi-cylindrical pieces, two assemblies adjustably spaced along said frame; each said assembly comprising abutment plates adapted to engage with at least one of said diametrically opposed slots, hydraulic cylinder means adapted to force said abutment members apart, guiding means for guiding said abutment means, and pivot means.

4,886,041

CONTINUOUS PROCESSING BAKING MACHINES

Tsai A. Chen, 201 Sec. 3 BA-DAR, Taipei, Taiwan

Filed Apr. 7, 1988, Ser. No. 178,981

Int. Cl.[4] A21B *1/00*; F24C *15/32*; A23L *3/00*

U.S. Cl. 126—19 R **7 Claims**

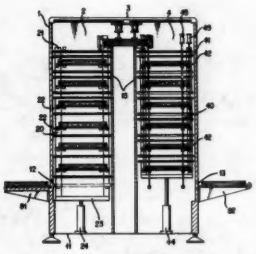
1. A continuous processing baking machine for baking raw materials placed in a plurality of baking molds, comprising:

an outer case having an entrance and an exit properly formed therein;

upgrading means positionally located within said outer case having a first cylinder vertically disposed on a floor portion of said outer case for transporting said baking molds from said entrance in an ascending substantially vertical direction, said first cylinder having an actuating rod and an upgrading frame having a plurality of baking positions firmly supported upon an end portion of said first cylinder actuating rod;

downgrading means positionally located within said outer case and spaced from said upgrading means having a second cylinder vertically disposed on the floor of said outer case for transporting said baking molds in a descending substantially vertical direction to said exit, said second cylinder having an actuating rod and a downgrading frame having a plurality of baking positions firmly supported upon an end portion of said second cylinder actuating rod;

transfer means disposed between said upgrading means and said downgrading means for sequentially transferring said baking molds from an uppermost portion of said upgrading means to an uppermost portion of said downgrading means; and,



heating means movably mounted within said outer case for baking said raw materials, said heating means including a support frame and a plurality of heating plates coupled to said frame to protrude substantially horizontally therefrom, said plurality of heating plates being interspersed into intervals between said plurality of baking positions of both said upgrading frame and said downgrading frame for baking said raw materials in said baking molds in both said ascending and descending baking positions, each of said plurality of heating plates having its temperature individually controlled in relationship to their oven location to provide even baking of said raw materials.

4,886,042

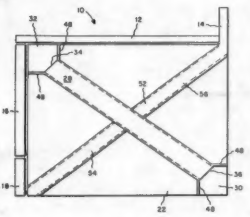
SIDE PANEL ASSEMBLY FOR KITCHEN RANGE

Warren F. Bessler, Schenectady, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed Jan. 19, 1989, Ser. No. 299,098

Int. Cl.[4] F24C *15/32*

U.S. Cl. 126—21 R **26 Claims**



1. A kitchen range side panel assembly adapted to enclose a side portion of a kitchen range, said side panel assembly comprising:

a substantially rectangular, planar panel having an outer surface and an inner surface, and air transporting means attached to said inner surface, said air transporting means comprising a channel member for transporting a flow of

cooling air from a lower rear portion of said panel at an interior of said range to an upper front portion of said panel at said interior of said range.

4,886,043

GAS BURNER

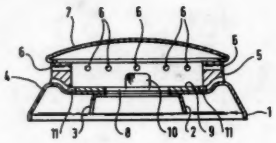
David W. Homer, Tamworth, United Kingdom, assignor to Parkinson Cowan Ltd., Birmingham, United Kingdom

Filed Sep. 13, 1988, Ser. No. 243,952

Claims priority, application United Kingdom, Sep. 16, 1987, 8721743; Feb. 23, 1988, 8804155

Int. Cl.[4] F24C *3/00*

U.S. Cl. 126—39 R **4 Claims**



1. A gas burner comprising a burner skirt assembly (1, 2) arranged to receive a combustible gas/air mixture and a burner head (5) provided with combustion ports (6) and supported on the skirt assembly, the supporting surface of the skirt assembly being formed so as to allow a metered amount of the gas/air mixture to flow to the outside of the burner head where it ignites to provide a retention flame below the combustion ports, the skirt assembly comprising a skirt (1) carrying a plate (9) of sheet material having a plurality of notches (11) at its periphery, the plate being substantially planar in the region of the notches (11), and locating means (10) being provided for locating the burner head so that it cooperates with the notches to provide metering apertures for the retention flame mixture.

4,886,044

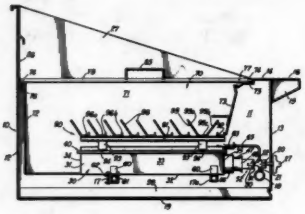
INFRARED GAS GRILL

Willie H. Best, 18C The Heritage, Columbia, S.C. 29201

Filed Aug. 17, 1988, Ser. No. 233,162

Int. Cl.[4] F24C *3/00*; A47J *27/52*

U.S. Cl. 126—39 C **26 Claims**



1. An infrared grill of the type having a cabinet and an infrared emitter disposed within said cabinet said infrared emitter having an upper surface for generating infrared radiation upwardly, a cooking grid carried by said cabinet above and in spaced relationship to said infrared emitter, wherein the improvement comprises:

an emitter shield assembly disposed over said infrared emitter and below said cooking grid, said emitter shield assembly having spaced baffles extending over said emitter and spaced below said cooking grid for shielding said infrared emitter from drippings from food supported by said grid above said infrared emitter, said baffles being so disposed with respect to each other and with respect to said cooking grid, that the infrared radiation from the said infrared emitter will pass directly from said infrared emitter between said baffles and impinge on the food disposed on a portion of said cooking grid.

21. Process for simultaneously cooking meats at different rates comprising:

(a) disposing an infrared radiation emitter in a prescribed position for emitting infrared radiation in an upward direction;

(b) supporting meats to be cooked in transversely spaced locations above said emitter, one location being vertically above said emitter; and

(c) shielding the meat located in said one location from the full intensity of the infrared radiation from the emitter while permitting the maximum radiation from the emitter to impinge on the meat in the other location.

4,886,045

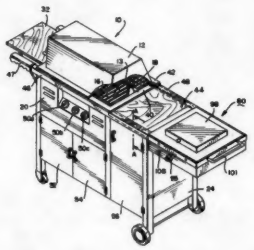
SIDE BURNER ATTACHMENT FOR GAS-FIRED GRILL

John S. Ducate, Jr., Columbia; Bernard Berger, Aiken, both of S.C.; Neal Boatwright, New Berg, Ind., and Jon S. Walters, Chesterfield, Mo., assignors to The Ducane Company, Inc., Columbia, S.C.

Filed May 2, 1989, Ser. No. 346,489

Int. Cl.[4] A47J *37/00*; F24C *3/00*

U.S. Cl. 126—41 R **21 Claims**



1. A side cooker apparatus on a gas-fired grill having a fuel supply means and a housing defining a compartment with a main gas burner and including a front wall opposite to a rear wall, said apparatus comprising:

a pair of substantially parallel bars, each of said bars having a holding portion and a projecting portion;

an auxiliary gas burner supported between said holding portions of said bars; and,

a pair of channel members fixedly mounted on said housing and each extending along a corresponding one of said opposing front and rear walls of said housing, said channel members being dimensioned for slidably receiving therein said projecting portions of said bars so that said auxiliary gas burner is detachably mounted on said gas-fired grill in a cantilevered position to one side of said housing.

4,886,046

MOTOR CONTROL CIRCUIT FOR AN EYE LEVEL RANGE

Raymond L. Welch, Grand Prairie Township, Marion County, Ohio, assignor to Whirlpool Corporation, Benton Harbor, Mich.

Filed Oct. 26, 1987, Ser. No. 112,449

Int. Cl.[4] F24C *15/20*

U.S. Cl. 126—299 D **8 Claims**

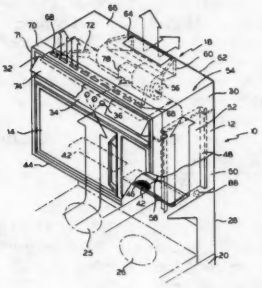
1. In a cooking apparatus having a cabinet defining an oven cavity, wherein the cabinet is mounted above a source of heat, and wherein said cabinet houses control elements for said oven, the improvement comprising:

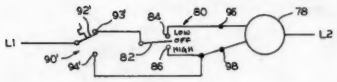
airflow means for conducting air through said cabinet, said

airflow means defining a relatively high rate of airflow and a relatively low rate of airflow;

first control mean for commanding said airflow means to selectively provide no airflow, said relatively low rate of airflow, or said relatively high rate of airflow;

means for sensing temperature produced by said source of heat; and





second control means coupling said sensing means and said airflow means for automatically operating said airflow means to operate at said high rate of airflow when said sensing means senses a preselected high temperature and wherein said airflow means cools said control elements when said preselected high temperature is sensed.

4,886,047

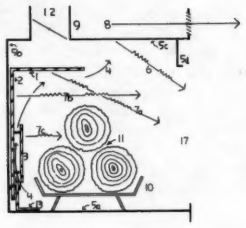
FIREPLACE HEAT EFFICIENCY DEVICE

Paul R. Bonin, P.O. Box 53122, Lafayette, La. 70505

Filed Oct. 7, 1988, Ser. No. 254,611

Int. Cl.[4] F24B *1/195*

U.S. Cl. 126—552 **9 Claims**



5. A fireplace heat efficiency device for use in a fireplace having a firebox floor, a fuel grate, a heat source, and rear wall, said device comprising:

a single imperforate sheet of material including a substantially vertical surface, a substantially horizontal surface, and a bent section between said substantially vertical surface and said substantially horizontal surface;

a substantially vertical shield attached to said substantially vertical surface of said single sheet of material, and a passageway between said shield and said substantially vertical surface, said passageway providing substantially unobstructed flow of air upwardly between said shield and said substantially vertical surface, wherein said substantially horizontal surface is directly exposed to said heat source.

4,886,048

HYDROGEN PUMP

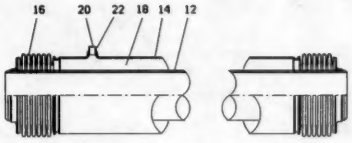
Isaac J. Labaton, 5/9 HaTenna, Givat Ze'ev, Jerusalem, and Yehuda Harats, 53 Hizkiyahu Hamelech, Jerusalem, both of Israel

Filed Mar. 23, 1988, Ser. No. 173,189

Claims priority, application Israel, Mar. 31, 1987, 82070

Int. Cl.[4] B22B *19/00*

U.S. Cl. 165—104.27 **5 Claims**



1. A hydrogen pump for vacuum insulation jackets for a vessel or pipe which holds or through which flows a hydrogen-containing medium at temperatures such that hydrogen permeates into said jacket, comprising a palladium or palladium alloy membrane exposed on a first side to an external oxidizing atmosphere having a relatively high hydrogen partial pressure, and on a second side to the evacuated space having a relatively low hydrogen partial pressure within said jacket, wherein said membrane enables the flow of said hydrogen from said evacuated space through said membrane into said oxidizing atmosphere and said palladium membrane catalyzes the reaction of said hydrogen permeated through said palladium membrane and oxygen present in said external atmosphere to form water to reduce the hydrogen partial pressure at said second side of the membrane creating a hydrogen gradient that moves said hydrogen from said evacuated space to said external atmosphere.

4,886,049

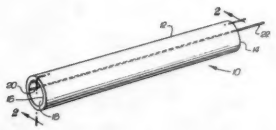
MEDICAL INSTRUMENT COVER

Robert L. Darras, 2219 Mount Shasta Dr., San Pedro, Calif. 90732

Filed May 17, 1988, Ser. No. 195,039

Int. Cl.[4] A61B *1/00*

U.S. Cl. 128—4 **12 Claims**



1. A medical instrument cover, said cover comprising:

an elongate generally tubular sheath of an elastomeric material being open at both ends, defining an interior surface and being configured to fit on a medical instrument; and

means for removing the cover from the medical instrument, wherein the means for removing the cover comprises a filament attached to the interior surface of the sheath and extending along the elongate direction.

4,886,050

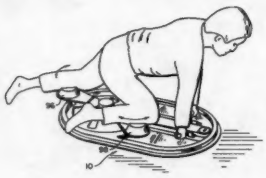
DEVICE PERMITTING A USER TO SIMULATE CRAWLING MOTIONS TO IMPROVE MOVEMENT OF THE TRUNCAL MUSCLES AND SPINE

John F. Iams, Poway; Robson L. Splane, Jr., Granada Hills, and John A. Drusch, III, Escondido, all of Calif., assignors to Superspine, Poway, Calif.

Division of Ser. No. 844,073, Mar. 25, 1986, Pat. No. 4,789,475. This application Oct. 31, 1988, Ser. No. 265,828

Int. Cl.[4] A61H *1/02*

U.S. Cl. 128—25 R **6 Claims**



1. A method of manipulating a person's truncal muscles and spine comprising:

causing the person to kneel on all fours; while

first emplacing a one like pair of the users hands or knees upon a stationary rest; while

second emplacing the remaining like pair of the users hands or knees upon moving rests which are reciprocally movable in the arc of a substantially level circle;

moving the remaining pair of the user's hands or knees independently upon the moving rests oppositely reciprocally each along a different portion of the arc of the same substantially level circle;

wherein upon such times as the second emplacing is of the user's two knees then the moving oppositely in the circular arc will cause simultaneous lateral motion in extension or flexion of the user's one leg while there is independent lateral motion in flexion or extension of the user's remaining leg;

wherein neither of the remaining pair of the user's hands or knees moves in a straight line, but rather moves in the arc of a circle, in order that the truncal muscles and spine are manipulated in a natural crawling motion during which the user's hands or knees are not constantly in line with the axis of the torso but rather swing outwards during the crawling motion.

4,886,051

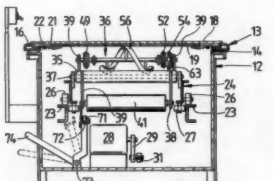
MASSAGING BED

Francis E. White, 1437 Panorama Dr., Birmingham, Ala. 35216

Filed Jun. 27, 1988, Ser. No. 211,939

Int. Cl.[4] A61H *7/00*

U.S. Cl. 128—52 **17 Claims**



1. Apparatus for massaging the back of an individual comprising:

(a) a frame supporting a flexible cover upon which the individual may rest;

(b) a reciprocating carriage mounted to said frame beneath said cover for driven reciprocation longitudinally along said frame;

(c) roller means, mounted for concomitant movement with said carriage, for point contact with the underside of said flexible cover along a substantially non-repeating path including at least one arcuate tread mounted in spaced relation on a shaft for rotation about the axis of said shaft, said arcuate tread having a center of curvature coincident with the axis of said shaft, with said arcuate tread extending about said shaft at an oblique angle thereto such that a different region of said tread comes into contact with said flexible cover and the point of contact moves laterally and longitudinally with respect to said flexible cover as said carriage reciprocates; and

(d) means for biasing said arcuate tread against said flexible cover.

4,886,052

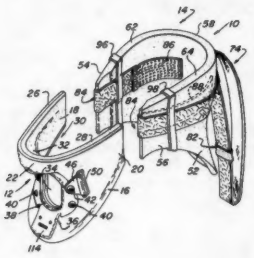
EMERGENCY MEDICAL CERVICAL COLLAR

Anthony Calabrese, Philadelphia, Pa., assignor to Charles Greiner and Company, Inc., Westville, N.J.

Continuation-in-part of Ser. No. 70,992, Jul. 8, 1987, abandoned, which is a continuation-in-part of Ser. No. 41,898, Apr. 23, 1987, abandoned. This application Nov. 30, 1987, Ser. No. 125,730

Int. Cl.[4] A61F *5/04*

U.S. Cl. 128—75 **44 Claims**



1. Emergency medical cervical collar, comprising:

first and second discrete body halves,

one of said halves being a front half and the other being a rear half, each half being generally U-shaped with a bight portion and a pair of end portions extending from the bight portion and preformed from soft, flexible material,

said rear half having a rigid support member at the bight portion thereof and slits located in the soft flexible material on opposite sides of said support member, the slits extending along sides of said support member to increase the flexibility of said rear half, and

means for securing said body halves together with the end portions of said body halves in adjustable overlapping relation.

4,886,053

STAY FOR ORTHOPEDIC APPLIANCE FOR THE KNEE

Charles O. Neal, Knoxville, Tenn., assignor to DeRoyal Industries, Inc., Knoxville, Tenn.

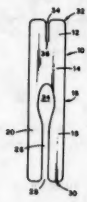
Filed Jul. 21, 1988, Ser. No. 222,146

Int. Cl.[4] A61F *5/01*

U.S. Cl. 128—80 C **6 Claims**

1. In an orthopedic appliance for immobilizing a knee joint including a body member configured to at least partially encircle the leg at the knee and extending upwardly and downwardly from the knee along the thigh and calf respective distances sufficient to provide attachment locations of the body member to such thigh and calf, and covering the area of

the knee within which the peroneal nerve resides, and means securing said body member to said thigh and calf, the improvement comprising an elongate stay of generally planar geometry having a width sufficient to overlie at least a majority of the lateral surface of the knee and including that lateral portion of the knee which includes a portion of the fibular head and that portion of the peroneal nerve which overlies the fibula laterally thereof and adjacent the fibular head, said stay including means defining a generally bulbous opening extending through the thickness of said stay in that portion thereof overlying said fibular head and peroneal nerve portions, said bulbous opening being of a size and geometry such that said stay does not bear substantially against such peroneal nerve portion when said stay is secured in said overlying relationship to said knee, said



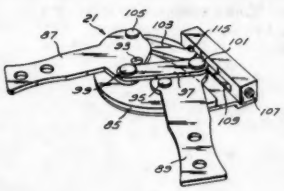
stay having a first generally planar section and a second bifurcated section, including first and second elongate generally planar legs disposed on opposite sides of the approximate longitudinal centerline of said stay, said stay being associated with said body member in position to overlie a lateral side of the knee and of a length sufficient to extend above and below said knee with its longitudinal centerline generally aligned with said leg when fully extended, said first section of said stay being bendable along the approximate longitudinal centerline thereof whereby said first section is caused to conform to the contour of that portion of said leg underlying said first section and said first and second leg members are caused to rotate in opposite directions and conform to the contour of said calf when said appliance is applied to the leg.

4,886,054

KNEE BRACE WITH CAMMED STOP LEVER

Edward L. Castillo; James D. Castillo, both of Mission Viejo, and Michael S. Castillo, San Clemente, all of Calif., assignors to Innovation Sports, Inc., Irvine, Calif.

Division of Ser. No. 68,030, Jun. 29, 1987. This application Oct. 26, 1988, Ser. No. 262,609
Int. Cl.[4] A61F *5/04*
U.S. Cl. 128—80 F **5 Claims**



1. A hinge for use in an orthopedic knee brace, said hinge comprising:

a generally flat base plate member having an inner surface and an outer surface;

a generally flat second plate member having an inner surface, an outer surface, and a camming edge;

said second plate member being affixed to said base plate member such that the inner surface of the second plate member is in substantial juxtaposition with the outer surface of said base plate member and further such that the camming edge of the second plate member resides above and extends over at least a portion of the upper surface of said base plate member;

first and second hinge members pivotally mounted upon the outer surface of said second plate member;

a guide block affixed to said base plate and having at least one guide slot formed therein, said guide slot having first and second end stops formed therein, said guide slot being opposite and in spaced relation to the camming edge of said second plate member;

at least one generally elongate stopping lever having first and second ends, the first end of said stopping lever being pivotally attached to one of said hinge members and the second end of said stopping lever being slidably disposed within the guide slot of said guide block, said stopping lever being positioned next to the camming edge of the second plate member such that, upon rotational movement of the hinge member to which said stopping lever is attached, a portion of said stopping lever will cam against the camming edge of said second plate member, thereby urging the second end of said stopping lever into said guide slot; and

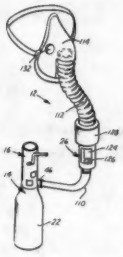
whereby said hinge is rotatable in a first direction to a point where the first end of said stopping lever abuts against the first end of said guide slot and alternately rotatable in a second direction to a point where the first end of said stopping lever abuts against the second end of said guide slot.

4,886,055

NEBULIZER DEVICE

John M. Hoppough, 921 S. Macomber, Greenville, Mich. 48838

Filed Jan. 22, 1988, Ser. No. 147,231
Int. Cl.[4] A61M *11/02*
U.S. Cl. 128—200.14 **33 Claims**



23. A nebulizer device for use with a source of oxygen flow, a source of atmospheric gas, a fluid supply container and respiratory ducting equipment leading to a patient, comprising:

a housing having means for coupling to said fluid supply container, a mixing chamber therein and an atmosphere inlet port opening into said mixing chamber;

an oxygen duct having means for coupling to said source of oxygen flow, said oxygen duct having an oxygen outlet disposed in said mixing chamber;

means for conveying fluid from said fluid supply container to said mixing chamber proximate said oxygen outlet;

an atmosphere restricting gate movably mounted on said housing so as to move in a first direction and a second direction nonparallel to said first direction, said atmosphere restricting gate configured to adjustably close said atmosphere inlet port and thereby selectively restrict air flow therethrough as said atmosphere restricting gate is moved in said first direction an in said second direction;

an oxygen restricting gate movably mounted on said oxygen duct so as to move in at least said first direction, said oxygen restricting gate coupled to said atmosphere restricting gate and configured to adjustably close said oxygen outlet and thereby selectively restrict oxygen flow therethrough as said atmosphere restricting gate is moved in said first direction, and said oxygen restricting gate coupled to said atmosphere restricting gate so as to not vary restriction of oxygen flow through said oxygen outlet as said atmosphere restricting gate is moved in said second direction.

4,886,056

BREATHING APPARATUS

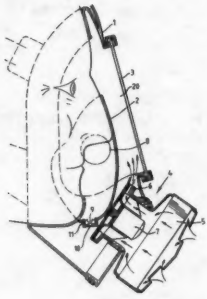
Keith Simpson, Odiham, United Kingdom, assignor to Sabre Safety Limited, Hampshire, England

Filed Mar. 20, 1989, Ser. No. 326,080

Claims priority, application United Kingdom, Mar. 21, 1988, 8806713

Int. Cl.[4] A62B 7/10

U.S. Cl. 128—201.25 **10 Claims**



1. Breathing apparatus for excluding noxious atmospheric gases from the respiratory passages of a wearer, the breathing apparatus comprising:

(a) an outer member,

(b) an orinasal mask located within the outer member,

(c) an inhale valve mounted in the orinasal mask and operable to connect the interior of the orinasal mask with the space within the outer member and outside the orinasal mask,

(d) an exhale valve mounted in the orinasal mask and operable to connect the interior of the orinasal mask direct to the ambient atmosphere,

(e) an air inlet to the outer member,

(f) a filter mounted in the air inlet,

(g) air moving means for moving air through the filter into the outer member to establish a pressure above ambient pressure within the outer member and outside the orinasal mask,

(h) a power source for driving the air moving means, and

(i) pressure responsive means responsive to the pressure difference between the pressure in the interior of the orinasal mask and the pressure in the space within the outer member and outside the orinasal mask for causing the power source to disable the air moving means at the commencement of an exhale period in a breathing cycle and to accelerate the air moving means at the commencement of an inhale period in the breathing cycle.

4,886,057

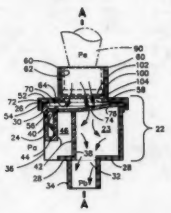
ASSISTED BREATHING INTERFACE DEVICE

Jerald L. Nave, Colorado Springs, Colo., assignor to E Z Breathe, Inc., Colorado Springs, Colo.

Filed Nov. 30, 1987, Ser. No. 126,420

Int. Cl.[4] A61M 16/00

U.S. Cl. 128—203.11 **13 Claims**



1. An assisted breathing interface device adapted for use by an emergency care administrator in performing artificial respiration of a patient, comprising:

a housing unit having an outer wall enclosing a chamber having an interior and including a first orifice lying in a first plane adapted to be engaged by the mouth of the emergency care administrator whereby air may be blown through the first orifice and into said chamber by the emergency care administrator and including a second orifice adapted to be inserted into and engaged by the mouth of the patient and operative to permit air to flow between said chamber and patient;

vent means for establishing air flow communication between said chamber and the ambient environment external of the patient when the first orifice is engaged by the mouth of the emergency care administrator and when the second orifice is engaged in the mouth of the patient, said vent means including an enclosed extension passageway within said chamber, said passageway terminating at a second plane parallel to said first plane to form a mouth with its entire perimeter lying in said second plane and in opposing relation to said first orifice;

valve means movable between a first position and a second position for permitting air flow through the first orifice and into said chamber in the first position and for substantially prohibiting air flow from said chamber into said first orifice in the second position.

4,886,058

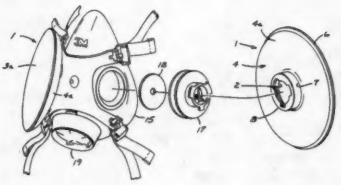
FILTER ELEMENT

Gerald M. Brostrom; Daniel A. Japuntich, and Sabrina M. Yard, all of St. Paul, Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed May 17, 1988, Ser. No. 195,029

Int. Cl.[4] A62B 7/00

U.S. Cl. 128—206.12 **41 Claims**



1. A filter element comprising

(A) substantially coextensive front and rear walls joined to

each other along their peripheral edges and defining an interior space between them; the front and rear walls each comprising at least one layer of a filter material, and the rear wall, including said layer of filter material, having an opening that provides access to the interior space defined by the front and rear walls,

(B) a porous layer contained between the front and rear walls which is substantially coextensive with the walls, which maintains the walls is a spaced-apart relationship over substantially their entire area, and which contributes no more than 50% of the total pressure drop across the filter element, and

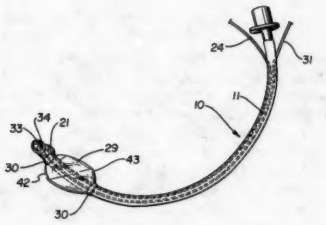
(C) a breather tube having one end that communicates through said opening with the interior space between the front and rear walls, and adapted at its other end for securing the filter element to a respirator face piece.

4,886,059

ENDOTRACHEAL TUBE WITH ASYMMETRIC BALLOON

Roland E. Weber, Minnetonka, Minn., assignor to Applied Biometrics, Incorporated, Minnetonka, Minn.

Filed Jun. 23, 1988, Ser. No. 210,718
Int. Cl.[4] A61M *16/00*; A61B *8/00*
U.S. Cl. 128—207.15 **4 Claims**



4. A probe having an elongated flexible member having an axis and an axis and a device mounted thereto whereby the device may be inserted into a mammallian body and passed through a tubular passageway in the body to a point where it is desired that the device contact the wall of said passageway to effectively operate the device, the improvement comprising that the said elongated flexible member includes an inflatable balloon cuff member asymmetric about the axis of said flexible member in proximity to and proximal along said flexible member will respect to the said device extending around the entire periphery of the flexible member and means for inflating said asymmetric balloon cuff member said balloon cuff member being mounted on the flexible member such that when inflated the balloon cuff member sealingly engages the wall of the passageway while urging the said device into contact with the inner wall of said passageway.

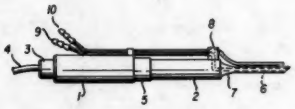
4,886,060

EQUIPMENT FOR USE IN SURGICAL OPERATIONS TO REMOVE TISSUE

Hans Wiksell, Odlingsvägen, Sweden, assignor to Swedemed AB, Uppsala, Sweden

Continuation of Ser. No. 45,927, May 4, 1987, abandoned. This application May 8, 1989, Ser. No. 349,966
Claims priority, application Sweden, Mar. 20, 1987, 8701153
Int. Cl.[4] A61B *17/36*
U.S. Cl. 128—303.14 **12 Claims**

1. An apparatus for use in surgical operations to remove tissue, comprising an ultrasonic knife means having a contact tip portion for contacting and imparting ultrasonic energy to the tissue to thereby impart ultrasonic vibrations and shattering forces to the contacted tissue so as to cut the tissue, transducer means which operates at ultrasonic frequency for ultrasonically oscillating the tip portion longitudinally and an ultrasonic frequency generator coupled to the transducer means for driving the transducer means, wherein the elements of the ultrasonic knife means in contact with the patient are electrically



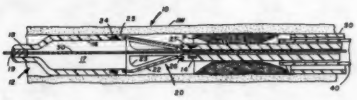
isolated from the other elements of the knife means, and coagulation means for temporarily emitting high-frequency energy for inducing heat in the tissue from the tip portion of the ultrasonic knife means for coagulating the tissue in order to achieve hemostasis.

4,886,061

EXPANDABLE PULLBACK ATHERECTOMY CATHETER SYSTEM

Robert E. Fischell, Dayton, Md., and Tim A. Fischell, Los Altos, Calif., assignors to MedInnovations, Inc., Dayton, Md.

Filed Feb. 9, 1988, Ser. No. 153,912
Int. Cl.[4] A61B *17/32*
U.S. Cl. 128—305 **38 Claims**



1. An apparatus for deployment within a vessel of a living body for removing obstructing tissue on the inner wall of said vessel, the apparatus comprising:

catheter means having a distal portion with a first more proximal region for cutting said obstructing tissue, and a second most distal region for collecting said obstructing tissue after it has been cut from the vessel wall, and said distal portion being capable of assuming a first and a second diameter, said second diameter being larger than said first diameter;

cutting means located at said first more proximal region of said distal portion of the catheter means for cutting said obstructing tissue as the catheter means is pulled back in a retrograde direction through said obstruction tissue;

tissue collecting means having a proximal and a distal end located at said second most distal region of said distal portion of the catheter means for collecting said obstructing tissue as it is cut from the vessel wall;

deployment means for selectively causing said distal portion to assume said first or second diameter; and

centering means on aid distal portion of the catheter means for engaging the inner wall of the vessel when said distal portion assumes said second diameter and for preventing the cutting means from contacting and cutting the inner wall of said vessel.

4,886,062

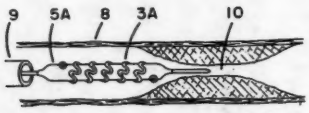
INTRAVASCULAR RADIALLY EXPANDABLE STENT AND METHOD OF IMPLANT

Dominik M. Wiktor, Cranford, N.J., assignor to Medtronic, Inc., Minneapolis, Minn.

Filed Oct. 19, 1987, Ser. No. 109,686
Int. Cl.[4] A61M *29/02*
U.S. Cl. 128—343 **13 Claims**

1. A radially expandable stent for implantation within a body vessel, comprising

a wire formed winding in a hollow cylindrical shape,
the winding including a preformed zig-zag type pattern continuous wire formed flat band,



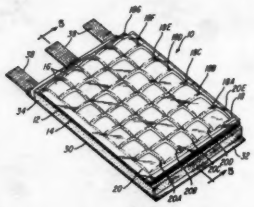
the flat band wound into a continuous helix the length of the stent, and
a full loop terminating both ends of zig-zag preformed wire band.

4,886,063

REUSABLE THERAPEUTIC DEVICE

Beverly J. Crews, 1019 Richard St., Miamisburg, Ohio 45342

Filed Jun. 29, 1988, Ser. No. 213,292
Int. Cl.[4] A61F *7/10*
U.S. Cl. 128—403 **20 Claims**



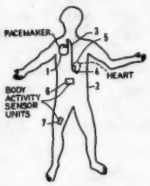
1. A reusable therapeutic device comprising:
an array of noncommunicating chambers spaced from each other and formed by means of a broadside of a first flexible, nonelastic, liquid impervious sheet securely engaged to a broadside of a second flexible, nonelastic, liquid impervious sheet, having affixed in proximity of an end of a broadside of said securely engaged sheets a component of a complimentary back-to-back releasable fastening means;
a plurality of flexible, elastic, liquid impervious packets containing a thermoresponsive mixture with one of the packets individually and snugly enclosed within one of the chambers;
a sheet of flexible, resilient material having affixed in proximity of an end of a broadside thereof, the other component of the complimentary back-to-back releasable fastening means, said other component being positioned opposite to the component affixed to said securely engaged sheets;
a backing sheet of supple fabric material with one broadside thereof affixed to the other broadside of the sheet of flexible, resilient material, and
an outer covering sheet of flexible, nonelastic, liquid impervious material with one broadside thereof affixed to the other broadside of said backing sheet, said covering sheet having affixed in proximity of an end of a broadside thereof a component of a complimentary back-to-back releasable fastening means while having affixed in proximity of an opposite end of the broadside thereof the other component of said fastening means.

4,886,064

BODY ACTIVITY CONTROLLED HEART PACER

Hans Strandberg, Sundbyberg, Sweden, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Nov. 25, 1987, Ser. No. 125,573
Int. Cl.[4] A61N *1/00*; H05G *00/00*
U.S. Cl. 128—419 PG **8 Claims**



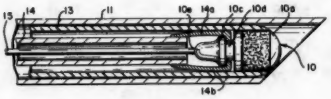
1. A body activity-controlled heart pacing system comprising:
at least one body activity sensor unit including means for sensing body activity and for generating a body activity signal corresponding thereto, and means for wirelessly transmitting said body activity signal, said at least one body activity sensor unit adapted to be disposed at a first body location;
a heart pacing unit adapted to be disposed at a second body location remote from said first body location and including pulse generating means for generating heart stimulating pulses at a basic pacing rate, means for wirelessly receiving said body activity signal transmitted by said at least one body activity sensor unit, and means connected to said means for wirelessly receiving for controlling said pulse generating means to vary said basic pacing rate as a function of said body activity signal;
said heart pacing unit further including means for receiving an information signal and means for wirelessly transmitting said information signal; and
said at least one body activity sensor unit further including means for wirelessly receiving said information signal transmitted by said heart pacing unit and means for altering the operation of said means for sensing body activity in response to said information signal.

4,886,065

IN VIVO ELECTRODE IMPLANTING SYSTEM

Earl R. Collins, Jr., La Canada, Calif., assignor to California Institute of Technology, Pasadena, Calif.

Filed Aug. 8, 1988, Ser. No. 229,284
Int. Cl.[4] A61B *5/04*; A61N *1/05*
U.S. Cl. 128—642 **4 Claims**



1. An electrode comprising a body of solid material and a conductive surface exposed on one side of said body of said material, said body being covered with a nonsoluble synthetic fabric and said fabric having loops protruding through interstices of the fabric, a flexible insulated conductor for making an electrical connection through said body to said conductive surface, said body securely holding said insulated conductor in electrical contact with said conductive surface, said body being comprised of a main cylindrical section, and said conductive surface forming a blunt nose for the electrode at one end of said cylindrical section, said insulated conductor passing through said main cylindrical section from the end opposite

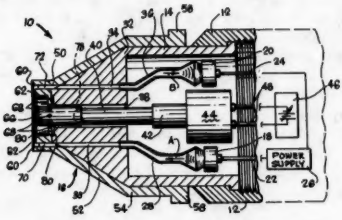
said blunt nose to said blunt nose for electrical contact therewith, said fabric being secured around said main cylindrical section, and said body being comprised of a smaller diameter section extending from said main cylindrical section on the end thereof opposite said blunt nose, said smaller diameter section having an annular groove formed at the interface with said main cylindrical section, and said insulated conductor passes through both said smaller diameter section and said main cylindrical section along the axis thereof.

4,886,066

TONOMETER HAVING ACOUSTIC COUPLING DETECTION

Thomas J. Ingalz, San Jose; Jerry B. Gin, Sunnyvale, both of Calif., and Vernon G. Wong, Rockville, Md., assignors to See Care Corporation, Sunnyvale, Calif.

Filed Sep. 13, 1988, Ser. No. 244,144
Int. Cl.[4] A61B *3/16*
U.S. Cl. 128—645 **20 Claims**



1. A tonometer for measuring the intraocular pressure of an eye, comprising,

a contacting member having an eye-engaging surface, said eye-engaging surface having at least one raised portion and a recessed portion, said recessed portion being open along said raised portion yet defining a generally enclosed volume when said eye-engaging surface is in contact with an eye under test,

means for generating an acoustic test signal and channeling said test signal to a first sector of said recessed area,

means for receiving said acoustic test signal at a second sector of said recessed area spaced apart from said first sector,

means for monitoring characteristics of said acoustic test signal received at said second sector and for detecting a variance when said characteristics satisfy at least one preselected condition, thereby indicating eye contact, and

means for sensing the pressure exerted by said eye on said contacting member when said eye-engaging surface is indicated to be in contact with said eye.

4,886,067

STEERABLE GUIDEWIRE WITH SOFT ADJUSTABLE TIP

Thomas J. Palermo, Methuen, Mass., assignor to C. R. Bard, Inc., Murray Hill, N.J.

Filed Jan. 3, 1989, Ser. No. 292,934
Int. Cl.[4] A61B *6/00*
U.S. Cl. 128—657 **5 Claims**

1. A steerable guidewire comprising:

an elongate solid walled tubular main wire having a proximal and a distal end;

an elongate helical coil having proximal and distal ends and being connected at its proximal end to the distal end of the main wire and extending distally of the main wire;

a distal core wire having proximal and distal ends and being connected to and extending distally from the distal end of the main wire, the core wire extending through the lumen of the coil and having a distal tip connected to the distal tip of the coil at a rounded end cap;

means defining a pull wire opening adjacent to the distal end of the main wire and adjacent the proximal end of the distal core wire;

a pull wire having a proximal end and a distal end, the distal end of the pull wire terminating short of the distal tip of the helical coil;

a longitudinally yieldable spring internal of the helical coil connecting the distal end of the pull wire with the distal end of the helical coil;

the pull wire extending proximally between the core wire and the coil and through the opening into the lumen of the main wire, the pull wire extending proximally through the lumen of the main wire to the proximal end of the main wire;

whereby the proximal end of the pull wire may be pulled to apply tension to the pull wire thereby to tension the internal spring and to draw at least a portion of the distal end of the helical coil into a curved configuration.

4,886,068

ULTRASONIC COUPLING AGENT

Nagao Kaneko, Yokohama; Moriyasu Wada, Ninomiya; Shiroh Saitoh, and Hiroki Honda, both of Yokohama, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Division of Ser. No. 120,162, Nov. 12, 1987, abandoned. This application Aug. 11, 1988, Ser. No. 230,867
Claims priority, application Japan, Jul. 29, 1985, 60-165735; Jul. 29, 1985, 60-165736
Int. Cl.[4] A61B *8/00*
U.S. Cl. 128—660.01 **8 Claims**

1. An ultrasonic monitoring method for carrying out an ultrasonic diagnosis by bringing an ultrasonic probe into contact with the skin of a subject, which comprises:

(a) coating said skin with an ultrasonic coupling agent; and

(b) bringing said ultrasonic probe into contact with said ultrasonic coupling agent coated on said skin immediately after step (a);

said ultrasonic coupling agent consisting essentially of at least one aqueous solution selected from the group consisting of an ethyl alcohol solution and an aqueous glycerine solution, and containing a silicone-based oil which is substantially soluble in said aqueous solution selected from the group consisting of cyclic polydimethylsiloxane, higher fatty acid denatured siloxane, poysiloxane-polyoxyalkylene copolymer, amino denatured siloxane, alkyl denatured silicone oil, methylphenyl silicone oil, and polyether denatured silicone oil.

4,886,069

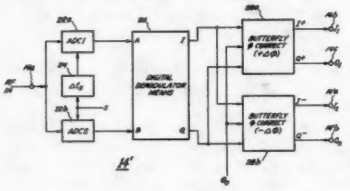
METHOD OF, AND APPARATUS FOR, OBTAINING A PLURALITY OF DIFFERENT RETURN ENERGY IMAGING BEAMS RESPONSIVE TO A SINGLE EXCITATION EVENT

Matthew O'Donnell, Schenectady, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed Dec. 21, 1987, Ser. No. 135,198
Int. Cl.[4] A61B *8/00*
U.S. Cl. 128—661.01 **21 Claims**

1. A method for substantially simultaneously obtaining from media a plurality M of different return signals, each from a different beam, responsive to a single excitation event, comprising the steps of:

(a) assigning each of the plurality M of beams to be substantially equally separated from a central beam by a small angular displacement;
(b) exciting the media with a single beam of energy focussed along the central beam;
(c) receiving a return signal responsive to the central beam;
(d) separately demodulating to baseband that portion of the return signal in each of a plurality N of reception channels, each associated with a different one of an entire array of transducers utilized to form the single central beam; and
(e) without additional time delay, independently rotating, prior to independent summation for generation of each of the plurality M of different beams, the phase of the demodulated baseband received return signal in each channel by an amount $\Delta\phi$ predetermined to displace the apparent origin of the return signal to a location along the associated one of the separated beams.

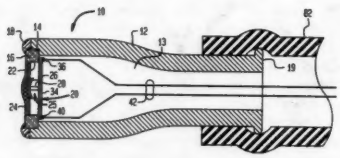


4,886,070

METHOD OF IN VIVO CALIBRATION OF A PRESSURE SENSOR

Philip C. Demarest, Pine Brook, N.J., assignor to Thermometrics, Inc., Edison, N.J.

Filed May 11, 1988, Ser. No. 192,604
Int. Cl.[4] A61B 5/02
U.S. Cl. 128—675 **4 Claims**



1. A method of checking the calibration of an in vivo pressure sensor, comprising the steps of

A. Providing a pressure sensor including a housing having an internal chamber, said pressure sensor including a pressure responsive element having inner and outer sides exposed respectively to pressure conditions in said internal chamber and to ambient conditions outside of said housing, a piezoresistive element positioned in said chamber, means coupling said pressure responsive element and said piezoresistive element in such a manner that when equal pressures are applied to opposite sides of said pressure responsive element, said pressure responsive element applies a predetermined load to said piezoresistive element and when unequal pressures are applied to opposite sides of said pressure responsive element, the load applied by said pressure responsive element to said piezoresistive element correspondingly changes, said pressure sensor further including conduit means in communication with said internal chamber and leading to a location remote from said chamber, and circuit means connected to said piezoresistive element and leading to a location remote from said chamber;

B. Providing meter means having a zero adjustment control in circuit with said circuit means;

C. Prior to inserting said pressure sensor into an in vivo environment,

(i) exposing both sides of said pressure responsive element to a common pressure source and setting said zero adjustment control so that said meter means reads zero pressure output,

(ii) applying a gradually increasing back pressure P_R to said internal chamber while applying atmospheric pressure to the outer side of said pressure responsive element to reduce said predetermined load to zero, and recording the back pressure reading P_{Ro} at which the output of said meter means stops decreasing,

D. Inserting said pressure sensor into an in vivo environment and

(i) observing the pressure value P_D displayed on the meter means with the back pressure P_R equal to atmospheric pressure or another known pressure,

(ii) slowly increasing the back pressure P_R until the displayed value P_D stops decreasing and then recording the back pressure value P_{Rc} corresponding to this point,

(iii) subtracting the value of P_{Ro} from the value of P_{Rc} obtained in step C(ii) above to obtain the true differential pressure P_{Dt} and comparing the value of P_{Dt} so obtained with the value of P_D obtained in step D(i) above,

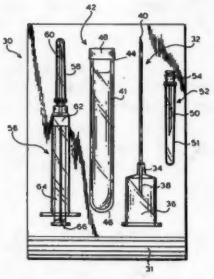
whereby, if the values of P_{Dt} and P_D compared in step D(iii) are in substantial agreement, the pressure sensor and meter means can be assumed to be in calibration and, if such values are not in substantial agreement, the pressure sensor and meter means can be assumed to be out of calibration.

4,886,071

PACKAGE INCLUDING SYRINGE AND NEEDLE

Jack J. Mehl, Landing; Raymond T. Wasek, East Rutherford, and Jay Desai, Closter, all of N.J., assignors to Becton, Dickinson and Company, Franklin Lakes, N.J.

Division of Ser. No. 546,674, Oct. 28, 1983, Pat. No. 4,666,850.
This application Mar. 2, 1987, Ser. No. 20,630
The portion of the term of this patent subsequent to May 19, 2004, has been disclaimed.
Int. Cl.[4] A61B 5/00
U.S. Cl. 128—760 **1 Claim**



1. A package for separating and handling the supernate and concentrate portions of a lysed and centrifuged blood sample held in an evacuated tube, characterized by

(a) a sealed sterile flexible pouch;
(b) an evacuated tube holder in said pouch;
(c) a supernate transfer needle mounted on and extending through said evacuated tube holder for withdrawing the supernate portion of the said lysed and centrifuged blood sample held in an evacuated tube;
(d) said supernate transfer needle being pointed at both ends

and having a long end for penetration into an evacuated tube holding said lysed and centrigued blood sample, and a short end extending into said tube holder;

(e) an evacuated tube in said pouch for insertion into said tube holder, and having a stopper for penetration by said short end for receiving the said supernate portion from an evacuated tube holding said lysed and centrifuged blood sample;

(f) a plugged vent needle in said pouch for venting the stopper of a sample containing evacuated tube holding said lysed and centrifuged blood sample during removal of the contents thereof; and

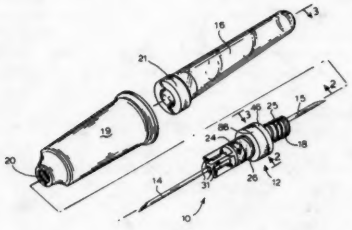
(g) a syringe and needle in said pouch for removing a concentrate portion from said lysed and centrifuged blood sample containing evacuated tube.

4,886,072

MULTIPLE SAMPLE NEEDLE ASSEMBLY WITH VEIN INDICATOR

Edward P. Percarpio, North Haledon, and Andrzej J. Plucinski, Norwood, both of N.J., assignors to Becton, Dickinson and Company, Franklin Lakes, N.J.

Filed Dec. 16, 1983, Ser. No. 562,309
Int. Cl.[4] A61B 5/14
U.S. Cl. 128—763 **14 Claims**



1. A needle assembly for collecting one or more liquid samples from a source for subsequent discharge into evacuated containers, comprising

(a) a housing having a forward end and a rearward end;

(b) a sample collection chamber in said housing;

(c) a first access opening in said forward end in liquid flow communication with said chamber;

(d) a first cannula extending outwardly from said first access opening for insertion into said source;

(e) a second access opening in said rearward end in flow communication with said chamber;

(f) a second cannula positioned in said second access opening and in flow communication with said chamber;

(g) valve means on said cannula for controlling discharge of liquid samples from said chamber into evacuated containers attached to said second cannula;

the improvement characterized by

(h) cooperating means on said forward end and said rearward end of said housing providing a fluid bleed passage means therebetween, said fluid bleed passage being separate from said flow communication between said chamber and said second access opening;

(i) vent means in said housing providing flow communication with said fluid bleed passage and ambient;

(j) swelling means in said fluid bleed passage responsive to aqueous containing materials passing therethrough for swelling and mechanically closing said fluid bleed passage upon contact with an aqueous containing material passing therethrough;

(k) said swelling means only partially occupying said fluid bleed passage prior to contact with an aqueous containing material;

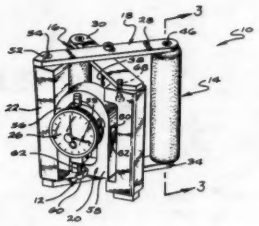
(l) whereby when said first cannula engages said source, aqueous containing liquid enters said chamber, forcing any gas therein through said fluid bleed passage and said vent means, causing said liquid to come into contact with said swelling means which swells and mechanically closes said fluid bleed passage.

4,886,073

SHOULDER STRENGTH ADDUCTION DEVICE

George A. Dillon, Westlake Village, and Max Van Mastrigt, San Jose, both of Calif., assignors to Dillon/Quality Plus, Inc., Camarillo, Calif.

Filed Apr. 18, 1988, Ser. No. 182,397
Int. Cl.[4] A61B 5/22
U.S. Cl. 128—774 **18 Claims**



1. A shoulder strength adduction device, comprising:

a pair of generally parallel upright hand grips;

an upper scissors frame including first and second frame links having rear ends connected respectively to the upper ends of said hand grips;

a lower scissors frame including first and second frame links having rear ends connected respectively to the lower ends of said hand grips;

a support bar connected between the forward ends of said first frame links of said upper and lower scissors frames;

a load bar connected between the forward ends of said second frame links of said upper and lower scissors frames, said load bar being connected to said second frame links to permit rotation of said load bar about a vertical axis; and

a force gauge unit mounted on said support bar and including reaction means presented toward said load bar for engagement therewith and for movement in response to such engagement upon application of adduction forces to said hand grips, said force gauge unit including means for quantifying and indicating the magnitude of said adduction forces.

4,886,074

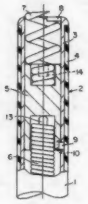
IMPLANTABLE LEAD ASSEMBLY WITH EXTENDABLE SCREW-IN ELECTRODE

Hans-Jürgen Bisping, Am Lütterbüschgen 12, 5100 Aachen, Fed. Rep. of Germany

Filed Mar. 14, 1988, Ser. No. 167,890
Int. Cl.[4] A61N 1/05
U.S. Cl. 128—785 **8 Claims**

1. A body-implantable, flexible lead assembly for electrical transmission to body tissue, comprising an electrode head open at one end, said head including an outer electrical insulating sheath, an axially shiftable connector block within said head, a fixation spiral connected to said block and having a tissue engaging end extending partially through said one end in a retracted, blocking position of said block, said head having a guiding device at said one end, a torsionally wound electrical coil conductor connected to said block, said coil having torsionally stored energy in said blocking position, a releasable blocking mechanism acting between said head and one of said block and said fixation spiral for retaining said spiral in said

retracted, blocking position, a turn of said spiral being inwardly spaced a predetermined distance from said guiding device in said block position, and said blocking mechanism being movable to a release position for unblocking said spiral



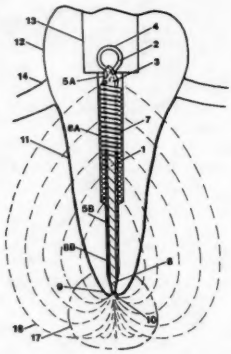
upon said block being axially shifted manually through said predetermined distance toward said one end, whereby upon unblocking said spiral turn engages said guiding device and threads further through said one end while rotating upon release of the torsionally stored energy of coil.

4,886,075

THERMOELECTRIC ION GENERATOR FOR ENDODONTIC THERAPY

J. Paul Jones, 413 N. Saddlebrook Cir., Chester Springs, Pa. 19425

Filed Dec. 2, 1988, Ser. No. 279,110
Int. Cl.[4] A61N *1/05, 1/30*
U.S. Cl. 128—787 **1 Claim**



1. An antibacterial and bone restoring ion generating device for implanting in extirpated root canals of teeth during endodontic therapy comprising:

a pointed center pin of a first metal, which is welded to a second metal wire located at the end of the pin opposite said pointed end, to form a thermo-electro junction;

a thin coating of insulating material: covering the entire length of said first metal pin except said pointed end and, including the welded junction to said second metal wire;

a small loop formed from the second metal wire directly adjacent to the insulated thermo-electric junction to act as a handling and pulling convenience;

a tightly wound coil formed from said second metal wire around said insulated first metal pin. and extending from said loop essentially half way to the pointed end of said first metal pin; said coil forming the cathode of the thermo-electric unit, while allowing easy bending and removal from said root canal; and

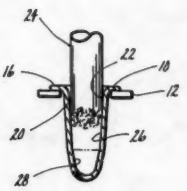
the pointed end of the first metal pin being ground to an essentially 70 degree included angle tapered point, which is the only part of the first metal pin which is not insulated by said coating of insulating material.

4,886,076

CIGARETTE SNUFFER

Leslie C. Gilbert, 207 Portree Dr., Dunedin, Fla. 34698, and Leo M. J. Rushlow, 3466 Moberly, Milford, Mich. 48042

Filed Jul. 20, 1987, Ser. No. 75,538
Int. Cl.[4] A24C *1/00*
U.S. Cl. 131—256 **7 Claims**



1. A device for snuffing a cigarette or the like having an unburned section terminating with a lighted end having a diameter slightly less than that of the unburned section, said device comprising:

a molded plastic tubular body having an open end with a diameter adapted to receive the lighted end of the cigarette, and a closed bottom, said bottom having a semi-spherical, interior space;

the tubular body having an interior tapered section between the open end and the closed bottom;

the tapered section having a length greater than the length of the lighted end of the cigarette;

the tapered section having a diameter along the length thereof that is gradually narrowed from said open end to a diameter less than that of the unburned section of the cigarette spaced from the closed bottom a distance at least as great as the length of the lighted end of the cigarette;

the semispherical closed bottom having a diameter slightly less than that of the unburned section of the cigarette;

wherein the diameters of the tapered section and the closed bottom are dimensioned such that the unburned section of the cigarette is squeezed by the tapered section of the tubular body as the cigarette is being inserted into the tapered section to form a snug fit between the cigarette and the tubular body to enclose and extinguish the lighted end adjacent the semi-spherical surface of the closed bottom to form an ash that is intact when removed from the tubular body.

4,886,077

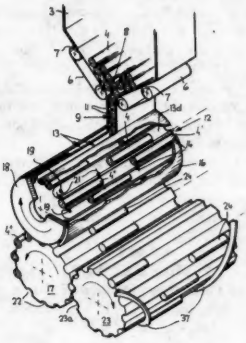
METHOD AND APPARATUS FOR ASSEMBLING PLAIN CIGARETTES WITH FILTER ROD SECTIONS

Alfred Hinzmann, Weams; Peter M. Preisner, Mechanicsville, and Timour T. Shu, Chesterfield, all of Va., assignors to Körber AG, Hamburg, Fed. Rep. of Germany

Continuation-in-part of Ser. No. 531,918, Sep. 13, 1983, Pat. No. 4,564,029. This application Dec. 2, 1983, Ser. No. 557,662
Int. Cl.[4] A24C *5/00, 5/32, 5/35, 5/47*
U.S. Cl. 131—282 **21 Claims**

1. A method of assembling plain cigarettes or analogous rod-shaped tobacco-containing articles with filter rod sections preparatory to conversion of assembled articles and sections into filter cigarettes or like rod-shaped smoker's products, comprising the steps of delivering a series of articles to an endless conveyor wherein successive articles of the series occupy first positions; advancing the delivered articles with the conveyor at right angles to their respective axes; shifting the articles axially to second positions which are spaced apart

from the respective first positions by distance at least matching the length of a filter rod section so that the thus shifted articles provide on the conveyor room for delivery of fresh articles of



the series to the first positions previously occupied by the shifted articles and each shifted article is in axial register with a non-shifted article; and introducing filter rod sections between the thus obtained pairs of registering articles.

4,886,078

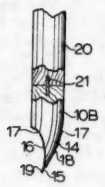
NAIL CLEANER

Jack Shiffman, 213 Copland Crescent, Saskatoon, Saskatchewan, Canada (S7H 2Z4)

Filed Jun. 17, 1987, Ser. No. 63,309

Int. Cl.[4] A45D *29/00*

U.S. Cl. 132—73 **9 Claims**



1. A nail cleaner comprising an elongated stick having at least one end portion formed from a rigid fibrous material and having an under-nail-engaging tip end formed thereon said tip end terminating in an end edge with a convex curvature across said tip end and a length substantially the same as the width of said end portion of said stick, a front surface of said tip end being concave and a rear surface of said tip end being convex, said surfaces meeting at the convexly curved end edge, said fibrous material being frayed at the tip end to provide a tuft of said fibrous material along said end edge to assist in scrubbing under the nail.

4,886,079

COSMETIC TEMPLATE

Lillian A. Mooney, 7520 E. 550 South, Zionsville, Ind. 46077

Filed Feb. 10, 1988, Ser. No. 154,232

Int. Cl.[4] A45D *40/30*

U.S. Cl. 132—319 **10 Claims**

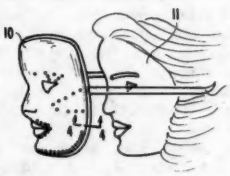
1. A method to be used for allowing cosmetics to be applied to a person's face comprising the steps of:

heating a flexible sheet of plastic to a heated condition;

placing said sheet in said heated condition against a person's face;

forcing said sheet to assume a shape corresponding to various contours of the person's face creating areas to be marked;

marking said areas on said sheet; and,



removing various portions from said sheet according to said marking creating a plurality of openings in said sheet for tracing cosmetic guides onto the person's face.

4,886,080

COSMETIC CONTAINER AND ASSEMBLY

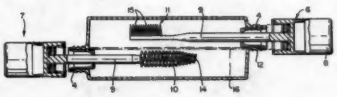
Rodney D. Cole, 24 Pine Walk, Cobham, Surrey, England

Continuation of Ser. No. 791,293, Oct. 25, 1985, abandoned. This application Jan. 22, 1988, Ser. No. 147,616

Claims priority, application United Kingdom, Oct. 25, 1984, 8426985

Int. Cl.[4] A45D *40/00*

U.S. Cl. 132—320 **10 Claims**



1. A package comprising a container holding a liquid, semi-liquid, paste-like or viscous material directly in contact with the interior of the container, the container having first and second opposed ends formed with respective first and second openings; a first applicator for the first opening; and a second applicator for the second opening, each applicator including a closure cap, securing means for detachably securing the closure cap to a respective opposed end of the container for sealingly closing the opening thereat, and an applicator portion projecting from each closure cap into contact with the material in the container, each applicator portion withdrawing a portion of the material from within the container upon removal of each applicator from the container through its respective opening, each applicator extending into the container a distance more than half of the distance between the opposed ends whereby the applicator portions are disposed along side each other in the container.

4,886,081

METHOD OF IMPACT CLEANING WITH SOLVENT SPRAY IN AN ENCLOSED CHAMBER

Ronald L. Blaul, Crystal Lake, Ill., assignor to Trigent, Inc., McHenry, Ill.

Division of Ser. No. 731,728, May 8, 1985, Pat. No. 4,676,261, which is a continuation-in-part of Ser. No. 672,145, Nov. 16, 1984, Pat. No. 4,561,903, which is a continuation of Ser. No. 410,589, Aug. 23, 1982, abandoned, which is a division of Ser. No. 275,965, Jun. 22, 1981, Pat. No. 4,433,698. This application Apr. 3, 1987, Ser. No. 33,784

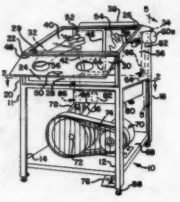
Int. Cl.[4] B08B *3/02*

U.S. Cl. 134—18 **11 Claims**

1. Cleaning process with an internally recirculating spray chamber machine self-contained in its operation by a cabinet having a blower window at the front side, said spray chamber

machine having a window nozzle supplied under pressure by air circulating means and a cleaning spray nozzle supplied with re-used liquid both under pressure and heated by cleaning liquid circulating means, a heater operative in the liquid circulating means to warm up and keep the liquid up to heat, a lamp behind the window in the cabinet operative to keep the chamber illuminated, said air if unprocessed tending to blow and impinge moisture onto the blower window, said cabinet which effects an open-condition at the front side being normally closeable in the lateral escape paths of out-blowing of the window nozzle and of overspray of the cleaning spray nozzle, comprising the steps of:

rendering at the outset at least the lamp and heater effectively operative for proper machine warmup;



utilizing the nozzles, as rendered in operable status, by pressurizing same initiating the eventual cleaning process with the cabinet closed;

opening the cabinet of the machine having the defined normal position closeable in the lateral escape paths of outblowing of the window nozzle and overspray of the spray nozzle;

holding the chamber and liquid substantially up to heat with the heater and lamp effective as in warmup; and

automatically, in response to a sensed open condition of the cabinet, disabling the nozzles from their operable status through confinement of the circulated air and liquid by preventing circulating entirely.

4,886,082

CLEANING APPARATUS

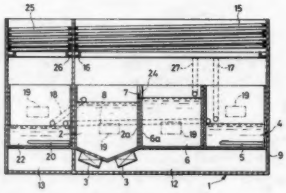
Satoshi Kato, Aichi, and Hisahito Kanasashi, Gifu, both of Japan, assignors to Brother Kogyo Kabushiki Kaisha, Aichi, Japan

Filed Jul. 1, 1987, Ser. No. 68,532

Claims priority, application Japan, Jul. 2, 1986, 62-155795; Dec. 26, 1986, 62-199626; Dec. 26, 1986, 62-199627

Int. Cl.[4] B08B *3/12*

U.S. Cl. 134—60 **11 Claims**



1. A cleaning apparatus comprising:

an ultrasonic cleaning tank having an ultrasonic vibrator;

a vapor cleaning tank;

a rinse cleaning tank disposed between said ultrasonic cleaning tank and said vapor cleaning tank;

first overflow means to provide an overflow path for a cleaning liquid from said rinse cleaning tank into said ultrasonic cleaning tank;

a distilling tank, having a heater disposed therein to heat cleaning liquid to at least its vaporization point;

second overflow means to direct cleaning liquid from said ultrasonic cleaning tank into said distilling tank;

third overflow means to direct cleaning liquid from said vapor cleaning tank into said distilling tank;

cooling means disposed above said distilling, ultrasonic cleaning, vapor cleaning and rinse cleaning tanks to cool cleaning liquid vapor, vaporized in each of said tanks, to at least its condensation point; and

supply means for supplying the condensed cleaning liquid obtained by said cooling means to said rinse cleaning tank and said vapor cleaning tank.

4,886,083

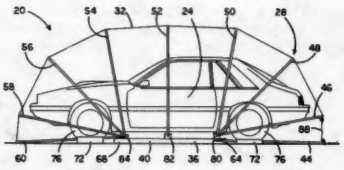
VEHICLE COVER

Mark Gamache, 86 Pelham St., Springfield, Mass. 01109

Filed Feb. 15, 1989, Ser. No. 310,581

Int. Cl.[4] E04H *15/06*

U.S. Cl. 135—88 **5 Claims**



1. A portable cover for a vehicle having a first side, a second side, a first end, a second end, a wheel at said first end, and a wheel at said second end, said cover comprising:

a foldable frame and weather resistant flexible sheet means attached to said frame for protecting the vehicle from weather,

said frame comprising a first ground-rail on said first side, and a second ground-rail on said second side, said first ground-rail comprising a first track, and said second ground-rail comprising a second track, said second track being generally parallel to said first track, said two tracks having a first end and a second end,

a plurality of pairs of support bar means, one bar of each pair being mounted by a first end on said first ground-rail and the other bar of the pair being mounted by a first end on said second ground-rail, the two bars of each pair being generally coplanar with one another,

of said plurality of pairs of support bar means:

a first pair of said support bar means mounting being near said first end of the tracks,

a second pair of said support bar means being mounted near said second end of the tracks,

a third pair of said support bar means being mounted between said first and second pairs, said mounting by said third pair being by means for sliding for traveling a length of said track,

each of said support bar means including a second end, and

each pair of support bar means comprising a spacer bar at said second ends of said support bar means of said each pair,

the mounting of said second and third pair of support bar means further comprising rotatable mounting means, said second and third pairs each being rotatable about said rotatable mounting means in a vertical arc that is coplanar with a line that is parallel with the tracks,

the mounting of said first pair of said support bar means comprising means for fixing said first pair against traveling the track, and further comprising rotatable mounting means, said first pair being rotatable about said rotatable

mounting means in a vertical arc that is coplanar with a line that is parallel with the tracks,

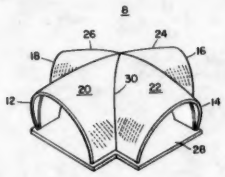
flange means mounted on a bar of said first pair of said support bar means, and on a bar of said second pair of said support bar means, said flange means for receiving wheels of said vehicle for holding said flanged bars to the ground.

4,886,084

PANELIZED FABRIC COVERED STRUCTURE

George W. Lawrence, Yarmouth, and C. William Moss, Portland, both of Me., assignors to Omar, Inc., Portland, Me.

Filed Oct. 1, 1987, Ser. No. 103,918
Int. Cl.[4] E04B *1/34*
U.S. Cl. 135—103 **30 Claims**



1. A panelized fabric-covered structure with removable and replaceable fabric panels comprising:

an expandable frame, including a plurality of rigid, substantially vertical frame members interconnected by a plurality of rigid transverse frame members, for holding a fabric cover;

means for attaching said substantially vertical frame members to a supporting surface;

a fabric cover including a plurality of discrete fabric panels each having at least one enlarged edge;

connector means for connecting said enlarged edges of said fabric panels to each other and to said frame; said connector means including a channel member for engaging said enlarged edge of said fabric panels, said channel member including a longitudinal bore larger than said enlarged edge with an opening smaller than said enlarged edge for allowing said panels to slide and rotate in said connector means to seat said panels in said frame and in relation to each other;

means for adjusting the length of said transverse members to tension said panels in the direction of said transverse members; and

means for adjusting the length of said substantially vertical frame members to tension said panels in the direction of said members to provide a taut fabric cover tensioned in transverse directions.

4,886,085

VACUUM CHECK VALVE AND METHOD OF CONTROL

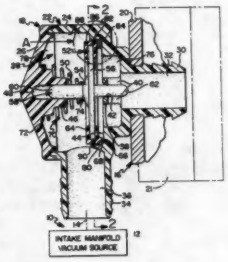
James W. Miller, Xenia, Ohio, assignor to General Motors Corporation, Detroit, Mich.

Filed Nov. 30, 1988, Ser. No. 277,628
Int. Cl.[4] F16K *15/06*
U.S. Cl. 137—1 **7 Claims**

6. The method of controlling undesirable valve pulsations and noises generated thereby in a check valve assembly when the valve member thereof may otherwise be excited by fluid flow pulsations generated in the fluid pressure source connected to one side of the check valve assembly, said method comprising the steps of:

(a) providing a check valve including a valve member which is normally closed and opens when the absolute pressure on one side thereof exceeds the absolute pressure on the other side thereof by a predetermined value, the check valve being exposed to fluid flow pulsations from a fluid pressure source;

(b) in the first stage of valve opening movement from the closed valve posiion and the last stage of valve closing movement from the open valve position providing a flow restriction around the valve member which dampens the movements of the valve member in the axial opening and closing directions;



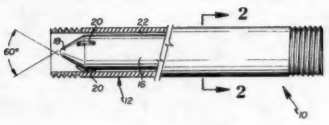
(c) and causing a radially directed fluid flow discharge from around the valve member initially only in a selected circumferentially located position during the first stage of valve opening movement and during the last stage of valve closing movement, generating a side load force on the valve member which disappears while the valve member is in and near its fully open position.

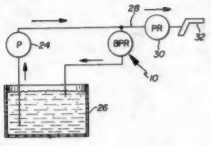
4,886,086

NON-DEGRADING PRESSURE REGULATOR

Arthur W. Etchells, Philadelphia, Pa., and David J. Donofrio, Wilmington, Del., assignors to Graco, Inc., Minneapolis, Minn.

Filed Dec. 23, 1987, Ser. No. 136,982
Int. Cl.[4] B05C *11/10*
U.S. Cl. 137—1 **16 Claims**





10. A method of regulating the pressure of a degradeable fluid material having a density, flow rate and viscosity without causing undue degradation and comprising the steps of:

passing the fluid through an orifice having a gap and a length; and

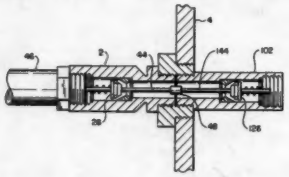
maintaining the flow through said orifice in the laminar regime at all times in order to prevent degradation of said degradable materials.

4,886,087

FUEL SPILL PREVENTION VALVE

Garret Kitchen, 3030 Spangle Rd., Columbus, Ohio 43207

Filed Sep. 19, 1988, Ser. No. 245,518
Int. Cl.[4] F16L *29/00*
U.S. Cl. 137—68.1 1 Claim



1. An apparatus for preventing a fuel spill from a plural container fuel storage system having an interconnecting fluid conduit in the event the conduit is ruptured, the apparatus including at least two valving arrangements one for connecting each end of said fluid conduit to a different one of said fuel containers, each valving arrangement comprising:

(a) an exterior valving member having a bias means urging the valving member closed, the exterior member adapted at a first end for connecting in fluid communication with the fluid conduit and at a second, opposite end for being affixed to the exterior of a said container;

(b) an interior valving member having a bias means urging the valving member closed and adapted for being affixed in mating arrangement and in fluid communication with the exterior valving member, the interior valving member being in fluid communication at an end opposite its affixed end with the interior of the container;

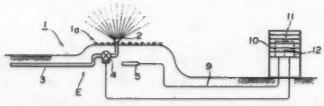
(c) a flow control rod means engaging the valving members and opposing the bias means to prevent the valve members from closing so that upon fracturing the exterior member, the rod means releases the valving means to permit the bias means to close the valving members and prevent fluid communication through the valving members, the flow control rod comprising a pair of aligned non-frangible rods each extending centrally from a different one of the valving members to form a clearence space, each rod having an opposed tapered tip and an interposed, central member seating against the opposed tapered tips but not surrounding non-tapered portions of the rods.

4,886,038

METHOD AND APPARATUS FOR MEASURING WATER CONTENT

Kimitoshi Ryokai, and Naruki Wakabayashi, both of Tokyo, Japan, assignors to Shimizu Construction Co., Ltd., Tokyo, Japan

Filed Feb. 4, 1988, Ser. No. 152,350
Claims priority, application Japan, Feb. 6, 1987, 62-25870; Feb. 6, 1987, 62-25871; Feb. 6, 1987, 62-25872
Int. Cl.[4] B05B *9/06*
U.S. Cl. 137—78.3 10 Claims



1. A method of measuring a water content of a soil, comprising the steps of:

(a) arranging a temperature detection unit in the soil, the temperature detection unit including a heater, a heat sensor and heat conductive accommodating means for accommodating in a spaced manner both the heater and the heat sensor therein;

(b) energizing the heater;

(c) the heat sensor receiving heat from the heater to provide temperature signals;

(d) obtaining a thermal conductivity of the soil on the basis of the difference between temperature signals provided from the heat sensor at a time interval;

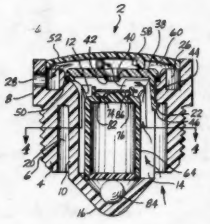
(e) calculating the water content from the thermal conductivity obtained in the step (d) in accordance with previously obtained data representing a correlation between thermal conductivity and water content of the soil.

4,886,089

GAS VENTING VALVE FOR LIQUID TANK

Zdenek Gabrlik, Brier; John M. Morris, Auburn, and Charles J. Green, Vashon, all of Wash., assignors to GT Development Corporation, Tukwila, Wash.

Filed May 27, 1988, Ser. No. 200,006
Int. Cl.[4] F16K *17/36*
U.S. Cl. 137—202 27 Claims



1. A gas venting valve for a liquid tank, comprising:

a valve housing defining a valve chamber with a vent opening;

a valve seat surrounding said opening adjacent to the chamber;

a float positioned in the chamber and including a mounting post; and

a valve element carried by the float and positioned to sealingly engage the valve seat when the float is moved toward the seat by a rising liquid level in the chamber, to prevent liquid from exiting the chamber through said opening; said valve element having a hole extending therethrough for pivotably mounting the valve element on the mounting post; and said valve element, said hole, and said post being dimensioned to permit the valve element to pivot freely, without bending, on the post about an axis that extends perpendicularly through the post, to cause the valve element to act like a lever and increase the effective weight of the float to overcome vapor pressure in the chamber and unseat the valve element when said liquid level falls.

4,886,090

APPARATUS FOR FAILSAFE METERING OF A FLUID

George F. Hays, Morristown, N.J., assignor to Ashland Oil, Inc., Russell, Ky.

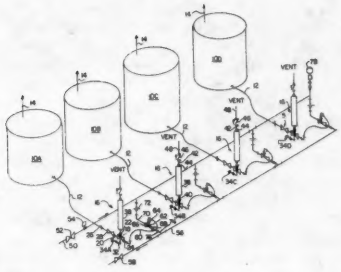
Continuation-in-part of Ser. No. 42,467, Apr. 24, 1987. This application Nov. 29, 1988, Ser. No. 277,282
Int. Cl.[4] F16K *11/00*
U.S. Cl. 137—624.11 12 Claims

1. An assembly for introducing a predetermined volume of a plurality of liquids into a process fluid at a predetermined time cycle without the aid of a pump, which comprises;

a plurality of storage tanks for said liquids;

a metering chamber of predetermined volume associated

with a respective storage tank, said metering chamber being vertically disposed below said storage tank;
an inlet conduit from a process unit for said process fluid;
an outlet conduit for returning process fluid to said process unit;
an eductor assembly associated with each metering chamber;
conduit means in fluid communication with said conduits and said eductor assembly associated with each metering chamber;
valve assembly means associated with each metering chamber having three ports for providing fluid flow between a first port and a second port of said valve assembly in a first



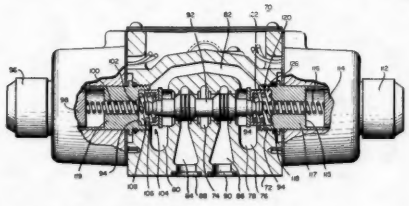
position and for providing fluid flow between said second port and a third port of said valve assembly in a second position thereof;
first conduit means for providing fluid communication between a respective one of said plurality of storage tanks and a first port of said valve assembly;
second conduit means for providing fluid communication between a second port of said valve assembly and said metering chamber;
third conduit means for providing fluid communication between a third port of said valve assembly means and said eductor assembly; and
timer means for placing said valve assembly in said first position from said second position.

4,886,091

ANTI-SHOCK DIRECTIONAL CONTROL FLUID VALVE

Lawrence B. Coleman, Bloomington, Minn., assignor to Continental Machines, Inc., Savage, Minn.

Filed Jun. 20, 1988, Ser. No. 208,656
Int. Cl.[4] F15B *13/044*; F16K *31/06*
U.S. Cl. 137—625.65 **12 Claims**



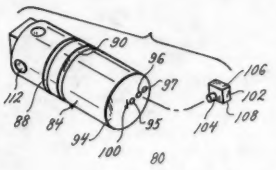
1. An improved anti-shock directional control fluid valve having a plurality of fluid ports, movable spool means for selectively allowing or denying fluid communication between selected of said fluid ports, and actuator means for imparting a motive force over a predetermined displacement to said spool means; the improvement comprising damping means for providing a retarding effect to displacement of said spool means, said retarding effect varying directly with said motive force, and a flexible drive means for communicating said motive force between said actuator means and said spool means; said flexible drive means being capable of momentarily storing energy to enable said spool means to move at a different rate than the rate at which said actuator means imparts said motive force, said flexible drive means being configured to preclude completion of travel of said spool means before said actuator means transverse said predetermined displacement, and said spool means moving in response to a resultant force at a speed appropriate to avoid hydraulic shock, said resultant force being substantially established by the difference between said motive force and said retarding effect.

4,886,092

LEVELING VALVE

Abraham Barzelay, Teaneck, N.J., assignor to Ridewell Corporation, Springfield, Mo.

Filed Oct. 24, 1988, Ser. No. 261,119
Int. Cl.[4] F15B *13/04*
U.S. Cl. 137—627.5 **19 Claims**



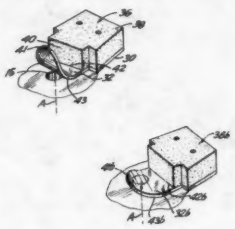
1. A leveling valve adapted to respond to changes in vertical distance between a vehicle chassis and at least one axle to adjust the air pressure of an air spring between the axle and the chassis, the valve comprising:
a valve body;
a chamber within the valve body;
a supply port in the valve body communicating with the chamber and adapted to be connected to a source of pressurized air;
an exhaust port in the valve body;
at least one delivery port in the valve body communicating with the chamber, and adapted to be connected to at least one air spring bag;
a piston reciprocally mounted in the chamber;
a mormally closed check valvel means between the supply port and the chamber and in jthe path of the piston whereby the check valve means is opened upon movement of the piston to an opening position in which fluid can flow from the supply port to the delivery port;
fluid passage means through the piston for accommodating fluid flow from the delivery port to the exhaust port, the fluid passage means being closed upon movement of the piston into contact with the check valve means and being opened upon movement of the piston away from contact with the check valve means;
means responsive to changes in the vertical distance between teh chassis and axle for controlling reciprocation of the piston including a piston guide, means for connecting the piston guide to the piston, means for reciprocating the piston guide and therewith reciprocating the piston, means for adjusting the axial position of the piston guide on the piston and thergy adjusting the position of the piston relative to the check valve,
a shaft rotatably supported by the valve body with its axis generally normal to the axis of the piston, an eccentric pin, means for mounting the eccentric pin on an end of the shaft including means permitting the selection of the degree of eccentricity of the pin relative to the axis of the shaft, a transverse slot in the piston guide for receiving the eccentric pin, and means responsive to changes in the vertical distance between the chassis and axle for rotating the shaft.

4,886,093

VENT VALVE OF AN AIR PUMP

Tsuyoshi Itakura, Tokyo, Japan, and Allan H. Willinger, Oakland, N.J., assignors to Itakura Soki, Tokyo, Japan and Brothers, Inc. Willinger, Oakland, N.J.

Filed Dec. 20, 1988, Ser. No. 287,403
Int. Cl.[4] F16K *15/14*
U.S. Cl. 137—855 **20 Claims**



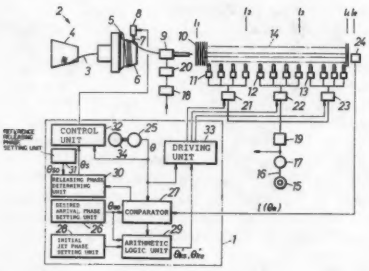
1. A vent valve of an aquarium air pump comprising a thin flat flexible valve body member having a base section, a tongue section and an intermediate connecting section, a separator wall dividing the pump into two chambers, said wall having a recess within which said valve body member is seated and having a vent hole opening into said recess in communication with a portion of said tongue section, a plug retained within said recess against said base section, said plug having a straight edge thereof extending transversely across the surface of said connecting section against and along which edge said tongue section is flexed to an open valve position when air flows through said vent hole in a direction toward said tongue section, said vent hole being eccentrically located relative to the direction of flexure enforced by said straight edge, whereby said tongue section is flexed open in a twisting manner under the force of said air flow and returns to its closed position against said separator wall with a rolling sidewise fold-down motion when said air flow lessens.

4,886,094

PICKING CONTROLLER FOR A FLUID JET LOOM

Yujiro Takegawa, Ishikawa, Japan, assignor to Tsudakoma Corp., Ishikawa, Japan

Filed Sep. 12, 1988, Ser. No. 243,045
Claims priority, application Japan, Sep. 4, 1987, 62-226299
Int. Cl.[4] D03D *47/32, 47/34, 49/50*
U.S. Cl. 139—452 **4 Claims**



1. A picking controller for use in combination with a picking device which draws out a weft yarn from a yarn package, stores the weft yarn temporarily on a measuring and storing drum, retracts a retaining member from the circumference of the measuring and storing drum by an actuator to release the weft yarn stored on the measuring and storing drum at a releasing phase of a loom, and inserts the weft yarn released from the measuring and storing drum in a shed by jets of fluid jetted by a picking nozzle and subnozzle groups each including subnozzles, comprising:

(a) an arrival sensor disposed on an arrival side of the loom to detect the arrival of a picked weft yarn at a fixed position on the arrival side of the loom and to provide a signal representing an actual arrival phase at which the picked weft yarn arrived at the fixed position on the arrival side of the loom;

(b) a comparator which compares the actual arrival phase detected by the arrival sensor with a desired arrival phase, to obtain the angular difference between the actual arrival phase and the desired arrival phase;

(c) a releasing phase determining unit which determines a new releasing phase on the basis of the angular difference;

(d) a control unit which compares the new releasing phase determined by the releasing phase determining unit with the phase of a main shaft of the loom and drives the actuator so as to retract the retaining member for a predetermined time upon the coincidence of the phase of the main shaft of the loom with the new releasing phase;

(e) an arithmetic logic unit which sets jet starting phases and jet ending phases meeting the actual running characteristics of the picked weft yarn respectively for the subnozzle groups each including subnozzles on the basis of the actual arrival phase detected by the arrival sensor; and

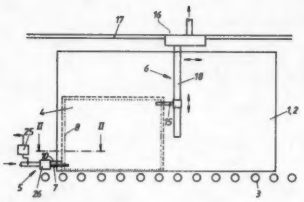
(f) a driving unit which compares the jet starting phases and the jet ending phases determined by the arithmetic logic unit with the phase of the main shaft of the loom, and drives on-off valves provided respectively in lines connecting the groups of subnozzles to a source of pressurized fluid so that the subnozzles jet the pressurized fluid respectively for fluid jetting periods demarcated by the jet starting phases and the jet ending phases, respectively.

4,886,095

PROCESS AND APPARATUS FOR FILLING AN INSULATING GLASS UNIT WITH FILLER GAS

Peter Lisec, Bahnhofstrasse 34, A-3363 Amstetten-Hausmening, Austria

Filed Jan. 15, 1988, Ser. No. 144,089
Claims priority, application Austria, Jan. 15, 1987, 68/87
Int. Cl.[4] B65B *31/04, 43/42;* E06B *3/66*
U.S. Cl. 141—4 **16 Claims**



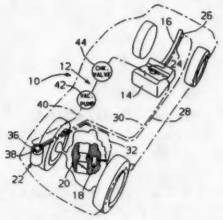
1. Process for filling an insulating glass unit **(4)** with a filler gas, wherein the filler gas is introduced at superatmospheric pressure by way of at least one inlet opening into an inner space **(14)** of the insulating glass unit **(4)** between two glass panes **(12, 13)**, and air and/or air-gas mixture is exhausted by way of at least one further opening **(9)** from the inner space **(14)** of the insulating glass unit **(4)**, characterized in that a pressure is exerted between solid members during the filling step on substantially all of the areas of the outer surfaces of the glass panes **(12, 13)** of the insulating glass unit **(4)** to be filled, this pressure being at least of the same magnitude as the pressure in excess of atmospheric pressure in the inner space **(14)** of the insulating glass unit **(4)** during introduction of the filler gas.

4,886,096

EVAPORATIVE EMISSION CONTROL SYSTEM

S. Raghuma Reddy, W. Bloomfield, Mich., assignor to General Motor Corporation, Detroit, Mich.

Filed Feb. 29, 1988, Ser. No. 162,153
Int. Cl.[4] B65B *31/00*
U.S. Cl. 141—45 **3 Claims**



1. In a vehicle having a liquid fuel tank and one or more potential loss points that produce a fuel vapor and air mixture, an evaporative emission control system, comprising;

a separation means for separating the fuel vapor from the air in said fuel vapor and air mixture,

vapor inlets connecting said separation means to said potential loss points so as to separate and gather said vapors,

a line connecting said separation means to said fuel tank and opening into the liquid fuel in said fuel tank,

a vacuum source in said line, and,

control means to energize said vacuum source and block said vapor inlets, thereby allowing said vacuum source to purge said vapors from said separation means, said control means also deenergizing said vacuum source and reopening said vapor inlets when said fuel vapors have been substantially purged from said separation means,

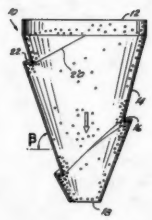
whereby, a negative pressure may be applied to said separation means by said vacuum source, purging said separated fuel vapors substantially without air, which then travel to said fuel tank via said line to be absorbed in said liquid fuel, said control means deactivating when said vapors are substantially purged from said separation means.

4,886,097

APPARATUS FOR HANDLING AND STORAGE OF PARTICULATE SOLIDS

Jose J. Garza-Ondarza, San Nicolas de Los Garza, Mexico, assignor to Hylsu S.A. de C.V., Mexico

Continuation of Ser. No. 96,617, Sep. 14, 1987, abandoned. This application Nov. 10, 1988, Ser. No. 270,382
Int. Cl.[4] B67C *11/00*; B65B *39/00*
U.S. Cl. 141—333 **17 Claims**



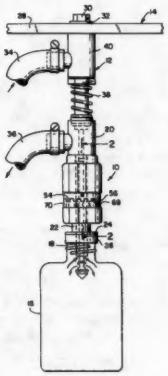
1. A gravity flow container for particulate solids comprising a downwardly converging container wall extending from at least an inlet to at least a discharge outlet, said wall having an internal contiguous surface with an integral internal inverted spiral step continuously extending from an upper portion to a lower portion of the wall along at least a part of said wall to provide an asymmetrical and continuous enlargement of the cross-sectional area of said container immediately below said step, the width of said step being greater than the thickness of said container wall.

4,886,098

ADJUSTABLE NOZZLE SPACER

Kenneth Herzog, 135 Industrial Blvd., Riverhead, N.Y. 11901

Filed Nov. 30, 1987, Ser. No. 126,465
Int. Cl.[4] A65B *39/02*
U.S. Cl. 141—368 **3 Claims**



1. An adjustable spacer for a gravity/pressure nozzle in a machine that fills a product into a container, said adjustable spacer fits onto a center overflow nozzle body and nozzle spacer which connects with a nozzle washer and container neck seal, said adjustable spacer comprises:

(a) a lower outer sleeve having internal threads and a plurality of first notches along an upper edge thereof;

(b) an upper outer sleeve having a plurality of second notches along a lower edge thereof that mate with the first notches and an inner seat therein near the second notches;

(c) a guide pin which is secured to and extends transversely within said upper outer sleeve between the inner seat and the second notches;

(d) a spring which fits within said upper outer sleeve onto the inner seat thereof; and

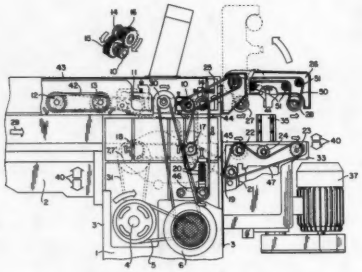
(e) an inner sleeve having external threads that engage with the internal threads of said lower outer sleeve, a vertical slot which runs through the external threads to allow said guide pin in said upper outer sleeve to travel up and down and a head portion forming an outer seat thereof to engage said spring and bias said upper outer sleeve downward so that when said upper outer sleeve is manually pulled upward said lower outer sleeve can be manually rotated to move up and down on said inner sleeve until said upper outer sleeve is released allowing the second notches to mate with the first notches allowing said adjustable spacer to increase and decrease its overall size between the lower overflow nozzle body and the nozzle spacer causing downward movement of said nozzle spacer and said neck seal to change overflow condition within the container.

4,886,099

WOODWORKING MACHINE WITH FEEDING SYSTEM

Alfredo Ferreira de Abreu, Trofa, Portugal, assignor to Mida—Máquinas Industriais do Ave, Lda., Trofa, Portugal

Filed Aug. 19, 1988, Ser. No. 233,805
Claims priority, application Portugal, Dec. 15, 1987, 86372
Int. Cl.[4] B27C *1/02*
U.S. Cl. 144—117 R 10 Claims



1. A woodworking machine, especially for planing and/or milling workpieces on one or more sides, of the type having a vertically adjustable feed table, at least one cutting head, and a feeding system including a plurality of cylindrical feed rollers, wherein the improvement comprises:

at least one drive means for driving all said feed rollers,

a driving shaft disposed transversely to said feed table,

at least two delivery feed rollers disposed before said cutting head,

at least two upper ejection feed rollers mounted swivellingly about and displaceably along said driving shaft, and

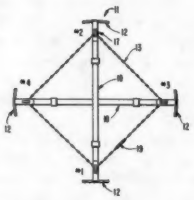
at least two lower ejection feed rollers rotatingly mounted in said feed table and vertically adjustable jointly therewith.

4,886,100

TRACTION DEVICE ADAPTED TO COMPENSATE FOR TIRE SIZE VARIATIONS RESULTING FROM INFLATION AND ROAD DEFLECTION

Thornton J. Parker, III, 4615 Ellicott St., N.W., Washington, D.C. 20016

Filed Jun. 6, 1988, Ser. No. 202,549
Int. Cl.[4] B60C *27/20*
U.S. Cl. 152—219 7 Claims



1. An anti-skid traction device adapted to being mounted on a vehicle tire quickly, from either side of the vehicle without raising or moving said tire comprising:

at least three shank and hook members in a spaced relationship with each other,

anti-skid hook members disposed at each of the radial outer end portions of said shank members adapted for transverse engagement across the thread surface of said tire at peripherally-spaced points,

said shank adapted at each of the inner end portions to slideably engage shank members arranged in opposed relation to permit the shank to freely slide to compensate for tire size variations resulting from inflation and road deflection, and

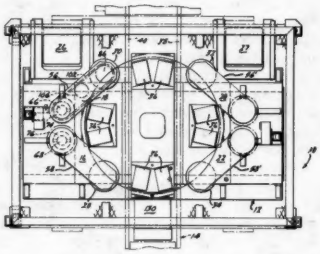
a flexible tension member adapted to effect equi-distant arrangement of said anti-skid members and to resist movement by tightening all said anti-skid members along the periphery of said tire when said anti-skid members are in contact with the ground.

4,886,101

WHEEL/TIRE LOAD SIMULATING APPARATUS

John F. Kinnick, Troy, and Chester P. Kozlowski, Royal Oak, both of Mich., assignors to Dominion Tool & Die Company, Inc., Roseville, Mich.

Filed Jul. 13, 1987, Ser. No. 73,170
Int. Cl.[4] B60C *25/06*
U.S. Cl. 157—1.22 25 Claims



1. A load simulating apparatus for applying a load on the periphery of a tire which has been mounted on a vehicle wheel and inflated to thereby insure seating of the tire bead on the vehicle wheel, said load simulating apparatus comprising:

means movable into engagement with said vehicle wheel and inflated tire to rotatably drive said vehicle wheel and inflated tire, said movable means including force applying means for applying a generally radially inwardly directed force on the periphery of said inflated tire to thereby insure seating of the tire bead on the vehicle wheel; and

support means engageable with an axial side portion of at least one of said wheel and said tire for inhibiting axial movement of said wheel, said force applying means also being operative to exert an axially directed force on said wheel and said inflated tire in a direction toward said support means whereby said force applying means and said support means cooperate to restrain said wheel and said tire during rotation thereof.

4,886,102

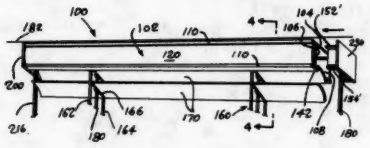
VENETIAN BLIND

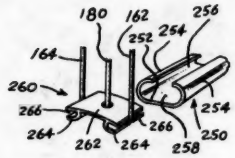
Victor Debs, 103 St. Marks Pl., Staten Island, N.Y. 10301

Filed Jul. 28, 1988, Ser. No. 225,222
Int. Cl.[4] E06B *9/38*
U.S. Cl. 160—177 18 Claims

1. In a venetian blind having a plurality of slats including a vertically movable bottom rail, a head, means for mounting said head on a support, means provided in said head for suspending said slats from said head, means provided in said head for lifting and lowering said slats, and means provided in said

head for tilting said slats from essentially horizontal positions to tilted positions and vice-versa; the improvement comprising





said head having a top and the absence of a bottom intermediate said top and said slats, said head being entirely imperforate.

4,886,103

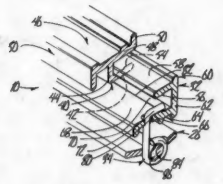
BLIND IN A WINDOW SUPPORT

Bruce A. Baier, Pella, Iowa, assignor to Rolscreen Company, Pella, Iowa

Filed Dec. 21, 1987, Ser. No. 136,010

Int. Cl.[4] E06B *9/38*

U.S. Cl. 160—178.1 **10 Claims**



1. A blind in window support, comprising:

a blind support having a horizontally disposed leg including an upstanding ledge and a vertical opening extending through said ledge, and

a blind hook having an L-shaped rod portion on its upper end extending through said opening with a horizontal leg being pivotally supported on said ledge.

4,886,104

WINDOW SHADE APPARATUS

John D. Eldridge, Jr., 971 Bayside Cove West, Newport Beach, Calif. 92660

Continuation of Ser. No. 14,866, Feb. 17, 1987, which is a continuation-in-part of Ser. No. 881,842, Jul. 3, 1986, abandoned. This application Aug. 11, 1988, Ser. No. 232,542

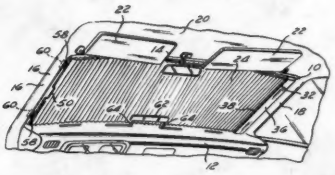
Int. Cl.[4] B60J *3/00*

U.S. Cl. 160—370.2 **28 Claims**

1. A window shade apparatus for use in a vehicle, said apparatus comprising:

a shade formed from a pleated material having a first edge and a second edge opposite said first edge, said shade being foldable into a compact, folded position by bringing said edges closer together, said shade being expandable into an expanded position by spreading said edges apart, said shade substantially covering an entire window on said vehicle when in said expanded position, and being sufficiently flexible to assume a curvature so as to conform to the shape of the windshield;

a case which encloses said shade when in said folded position, said first edge of said shade being secured to said case, said case having an open end through which said shade passes when in an expanded position, said case being no wider than said shade, said case having walls which are



oriented so as to guide said shade into said case as said shade is folded, so as to minimize bowing of said shade;

means for securing said case along a substantially vertical first edge of said window;

means for drawing said shade out of said case in a substantially horizontal direction and into said expanded position;

means for retaining said shade in said expanded position, wherein said edges of said shade are substantially parallel to each other.

4,886,105

PROCESS FOR CURING SAND MOLDINGS

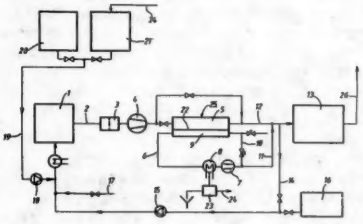
Dieter Nisi, Grossheppach, and Helmut Paul, Esslingen, both of Fed. Rep. of Germany, assignors to Daimler-Benz Aktiengesellschaft, Stuttgart, Fed. Rep. of Germany

Filed Oct. 31, 1988, Ser. No. 264,867

Claims priority, application Fed. Rep. of Germany, Oct. 30, 1987, 3736775

Int. Cl.[4] B22C *9/12*

U.S. Cl. 164—16 **4 Claims**



1. Process for curing sand moldings, in particular casting cores, made from synthetic resin-bound sand by means of gas- or vapor-formed catalyst which is added to a carrier gas, after which the catalyst/carrier mixture is forced through the mold containing the loose sand molding, the gas mixture escaping from the mold being collected as completely as possible without mixing with atmospheric air, and the catalyst component of the gas mixture being removed from the latter as completely as possible by condensation and, where appropriate, being re-used after removal of contaminants, wherein the gas mixture escaping from the mold is passed over the mixture feed side of a semipermeable membrane while a pressure is maintained on the permeate side of the membrane which is lower than the pressure on the mixture feed side, whereby the catalyst vapors preferentially permeate through the membrane, and a permeate carrier gas stream which is greater than the permeate stream passing through the membrane is passed over the per-

meate side of the membrane, and wherein the catalyst vapors are recovered from the permeate carrier gas stream.

4,886,106

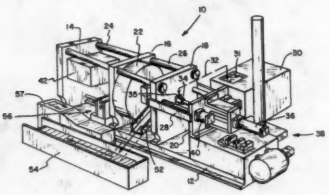
DIE CAST MACHINE WITH A TURRET

Charles H. Bennett, Mount Gilead, Ohio, assignor to HPM Corporation, Mount Gilead, Ohio

Continuation of Ser. No. 939,632, Dec. 9, 1986, abandoned. This application Mar. 15, 1988, Ser. No. 170,122

Int. Cl.[4] B22D *19/00*

U.S. Cl. 164—70.1 **17 Claims**



1. A die casting apparatus for performing a complete die casting operation, said operation including a plurality of functions, said apparatus comprising:

a frame including at least two stationary opposed pressure plates;

casting and compensating tooling comprising a pair of end tooling members respectively supported by said pressure plates;

a rotating turret member disposed between said two stationary plates in continuous fixed axial relationship therewith throughout cycling of the apparatus, said turret member comprising a plurality of die cavities, said turret means being rotatable relative to said end tooling members;

means for axially reciprocating said end tooling members relative to said turret;

a plurality of stations having tooling means located thereat for simultaneously performing at least one function of a die casting cycle at each said station as said turret rotates workpieces into position at said stations, said operations to be performed at each said station being selected so that the time required for completion of said operations at each of said plurality of stations is approximately equal.

4,886,107

PISTON FOR COLD CHAMBER

Kenneth P. Zecman, P.O. Box 39009, Redford, Mich. 48239

Continuation-in-part of Ser. No. 834,590, Feb. 28, 1986, Pat. No. 4,667,729. This application May 18, 1987, Ser. No. 50,786

Claims priority, application Canada, May 15, 1986, 509306

The portion of the term of this patent subsequent to May 26, 2004, has been disclaimed.

Int. Cl.[4] B22D *17/10, 17/20*

U.S. Cl. 164—113 **18 Claims**

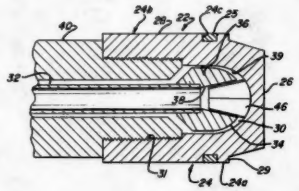
1. A shot tip for use in a shot sleeve comprising:

(A) an elongated plunger having a front end; and

(B) a generally cylindrical, unitary head, rigidly secured to said front end of said plunger and including a front body region, a main body region and a rear body region, the main body region having a cylindrical exterior configuration of relatively large, substantially constant diameter to form a relatively tight fit with the shot sleeve, the front body region being disposed forwardly of said main body region and having a diameter less than the diameter of said main body region, and the rear body region being disposed rearwardly of said main body region, the diameter of said rear body region being tapered radially inwardly in a direction opposite the main body region so as to form a relatively loose fit with the shot sleeve.

12. A method of minimizing binding of a shot tip in a shot sleeve while maintaining effective sealing as between the tip and the sleeve over extended periods of usage, said method comprising the steps of:

forming the tip so as to define a generally cylindrical, unitary shot tip head, said head including a front body region, a



main body region and a rear body region, the main body region having a cylindrical exterior configuration of relatively large diameter and said rear body region being tapered radially inwardly in a direction opposite the main body region; and

positioning a ring of relatively hard material in flush relation in the exterior circumference of said relatively large diameter main body region.

4,886,108

METHOD FOR FORMING A FIBER-REINFORCED METAL SHEET

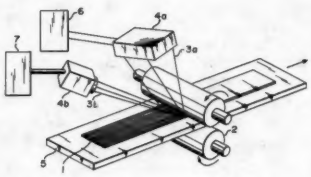
Shin Utsunomiya; Mitsuhiro Okumura, and Takeshi Morita, all of Amagasaki, Japan, assignors to Agency of Industrial Science and Technology and Mitsubishi Denki Kabushiki Kaisha, both of Tokyo, Japan

Filed Sep. 28, 1988, Ser. No. 250,230

Claims priority, application Japan, Jun. 27, 1988, 63-156860

Int. Cl.[4] B22D *11/00*

U.S. Cl. 164—461 **7 Claims**



1. A method for forming a fiber-reinforced metal sheet which comprises:

preparing a wire preform in which fibers and a matrix are combined together;

arranging regularly a plurality of wire preforms in a predetermined direction in a side-by-side relation;

irradiating simultaneously with a CO_2 laser beam and a YAG laser beam said regularly arranged wire preforms to elevate the temperature of the wire preforms; and

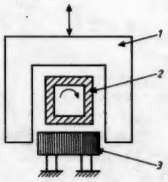
pressing said wire preforms by rollers while said wire preforms are at said elevated temperature.

4,886,109

MOVABLE STRAND STIRRER

Jan E. Eriksson, Mörarp, Sweden, assignor to Asea Brown Boveri AB, Västerås, Sweden

Filed Nov. 9, 1988, Ser. No. 268,791
Claims priority, application Sweden, Nov. 12, 1987, 8704423
Int. Cl.[4] B22D 27/02
U.S. Cl. 164—504 2 Claims



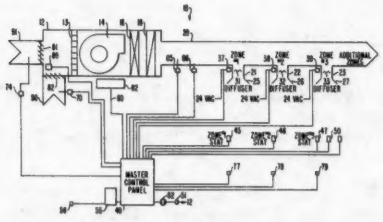
1. A device for stirring the molten portion of a cast strand coming from a continuous casting machine, comprising at least one two-phase or multiphase stirrer with a rotating magnetic field, said stirrer including a stationary iron core without winding separately mounted close to the strand, a movable iron core with a wound portion, and means for moving said iron core with the wound portion during the casting operation.

4,886,110

HVAC ZONE CONTROL SYSTEM

Ronald E. Jackson, Indianapolis, Ind., assignor to Valera Electronics Inc., Ontario, Canada

Filed Feb. 22, 1988, Ser. No. 157,727
Int. Cl.[4] F24F 3/048; F25B 29/00
U.S. Cl. 165—22 5 Claims



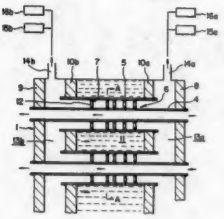
1. An HVAC system for a plurality of zones comprising an air handling unit including a blower, a plurality of heating stages and a plurality of cooling stages, said unit being connected via ducts to each of said zones, each zone having an air outlet provided with a two-position damper which is either open or closed and a thermostat for providing an input signal to a microprocessor, said microprocessor having a plurality of output means connected to activating motors to move said dampers and a plurality of output means for activating said heating and cooling stages, said system including an automatic mode of operation in which the microprocessor activates said heating stages of said cooling stages and controls the number of stages of heating or cooling which are energized in dependence on the difference between the number of zones thermostats calling for heating and the number of zone thermostats calling for cooling equalling or exceeding a predetermined number.

4,886,111

HEAT PIPE TYPE HEAT EXCHANGER

Satoru Nakai, and Mitsuru Kamei, both of Ibaraki, Japan, assignors to Power Reactor and Nuclear Fuel Development Corporation, Tokyo, Japan

Filed Jul. 28, 1988, Ser. No. 225,279
Claims priority, application Japan, Aug. 13, 1987, 62-200912
Int. Cl.[4] F28D 15/02
U.S. Cl. 165—70 5 Claims



1. A heat pipe type heat exchanger for a reactor, comprising:
(a) two outer tube plates extending generally vertically and disposed in parallel to each other and horizontally spaced apart from each other;
(b) a first fluid chamber for containing a heated fluid before heating, provided outside one of the outer tube plates;
(c) a second fluid chamber for containing the heated fluid after heating, provided outside the other outer tube plate;
(d) a plurality of inner tubes extending horizontally between and penetrating through the two outer tube plates, and each having one end sealingly fixed to one of the outer tube plates and opening into the first fluid chamber and the other end sealingly fixed to the other tube plate and opening into the second fluid chamber, the plurality of inner tubes provided for flowing the heated fluid from the first fluid chamber to the second fluid chamber;
(e) two inner tube plates disposed respectively inside of and in parallel to the outer tube plates and spaced apart from each other and from the outer tube plates, said inner tube plates defining therebetween a third fluid chamber containing a heating fluid;
(f) a first manifold plenum formed between one of the outer tube plates and an adjacent one of the inner tube plates;
(g) second manifold plenum formed between the other outer tube plate and the other inner tube plate;
(h) a plurality of outer tubes extending horizontally between and penetrating the two inner tube plates, each having one end sealingly fixed to one of the inner tube plates and opening into the first manifold plenum and the other end sealingly fixed to the other inner tube plate and opening into the second manifold plenum, and each said outer tube coaxially receiving one of the inner tubes therethrough in radially inwardly spaced relation therefrom;
(i) annular evaporation spaces each defined by an inner surface of the outer tube and an outer surface of the inner tube for evaporating a heat transfer medium which is condensed over the outer surfaces of the inner tubes;
(j) annular baffle plates coaxially and fixedly arranged within each said evaporation space so as to axially partition the evaporation space into many sections and so as to hold the inner tube and the corresponding outer tube spaced radially a substantial distance apart from from each other, the baffle plates having openings extending axially therethrough for providing restricted communication between axially adjacent sections;
(k) damage detecting means connected through a pipe and one of the manifold plenums to the evaporation spaces for detecting the condition of the heat transfer medium and

for detecting if heating fluid or heated fluid has leaked into the evaporation spaces; and

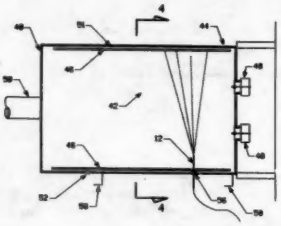
(l) heat transfer medium maintenance means connected through a pipe and one of the manifold plenums to the evaporation spaces for changing the heat transfer medium.

4,886,112

METHOD FOR CLEANING EXTERIOR SURFACES OF FIRE-HEATED TUBES

George J. Vinson, Louisa, Ky., assignor to Ashland Oil, Inc., Ashland, Ky.

Filed Jan. 21, 1988, Ser. No. 146,649
Int. Cl.[4] B24C *3/16*
U.S. Cl. 165—95 **4 Claims**



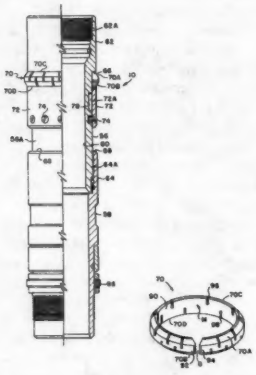
1. A process for cleaning fire-heated tubes during operation of a fired heater having a width and fired heaters oriented to burn in a direction parallel to one of its axes by removing combustion product deposits from external surfaces of said tubes, said process comprising: impacting, while in operation, external surfaces of said tubes with an abrasive caused to move substantially across said width and transverse to said one of its axes at a velocity at impact of at least 625 feet/second.

4,886,113

POSITIVE INDICATION SHEAR RING

Colby M. Ross, Carollton; Frank Giusti, Jr., Lewisville, and James D. Hendrickson, Carrollton, all of Tex., assignors to Otis Engineering Corporation, Carrollton, Tex.

Filed Mar. 11, 1988, Ser. No. 166,898
Int. Cl.[4] E21B *33/10*
U.S. Cl. 166—51 **15 Claims**



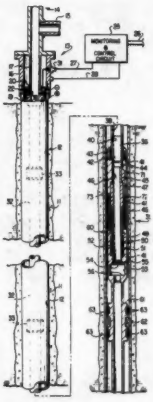
1. A snap ring comprising an annular body having an internal bore and a radially projecting, annular shoulder; said annular body having first and second end portions which are circumferentially displaceable with respect to each other; the body of said ring being intersected by a plurality of slots which are disposed at circumferentially spaced locations on the periphery of said body; and, the annular body of said snap ring having a back region diametrically opposite to said first and second end portions, said slots being angularly displaced with respect to each other by a relatively large angle toward the back region of said ring body and being angularly displaced by progressively smaller angles toward the end portions of said ring body.

4,886,114

ELECTRIC SURFACE CONTROLLED SUBSURFACE VALVE SYSTEM

Donald H. Perkins, Carrollton; Thomas M. Deaton, and Phillip S. Sizer, both of Farmers Branch, all of Tex., assignors to Otis Engineering Corporation, Dallas, Tex.

Filed Mar. 18, 1988, Ser. No. 169,814
Int. Cl.[4] E21B *43/12*
U.S. Cl. 166—65.1 **44 Claims**



1. An electrically operated solenoid actuated valve system for use in a borehole, comprising:

a well casing formed of electrically conductive material extending down the walls of the borehole;

a production tubing extending co-axially down the casing for the flow of borehole fluids from within the well to the wellhead, said tubing being formed of electrically conductive material and mechanically supported at the wellhead but being electrically insulated from the casing;

a tubular safety valve housing assembly attached to the tubing by means of a mounting assembly mechanically connected to the lower end of the tubing but being electrically insulated therefrom, said housing having means for mounting therein a solenoid coil and an armature moveable therein being affixed to actuate a safety valve in response to the flow of current through the solenoid coil, said safety valve being closed by a spring bias in response to deenergization of said coil, the body of said housing being electrically connected to the casing of said well bore to complete an electrical circuit therewith;

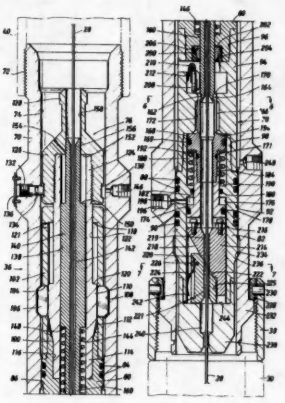
means for applying an electric current potential between the casing and tubing at the well head to cause current flow through the coil of said solenoid within said housing and produce movement of the armature of said solenoid to effect opening of said safety valve in response thereto.

4,886,115

WIRELINE SAFETY MECHANISM FOR WIRELINE TOOLS

Henry H. Leggett, and Howard R. Kitney, both of Singapore, Singapore, assignors to Eastern Oil Tools PTE Ltd., Singapore, Singapore

Filed Oct. 14, 1988, Ser. No. 257,693
Int. Cl.[4] E21B *29/04, 23/02, 34/14*
U.S. Cl. 166—77 **23 Claims**



1. A wireline safety mechanism for wireline assemblies comprising:

(a) a tubular body adapted for connection in a wireline assembly and receiving a wireline therethrough;

(b) a cutter actuator being movably disposed within said tubular body;

(c) a wireline cutter being movably positioned within said tubular body and being operatively interconnected with said cutter actuator, whereby predetermined movement of said cutter actuator induces said wireline cutter to sever the wireline extending through said wireline assembly;

(d) means for selectively inducing said predetermined movement of said cutter actuator; and

(e) locking means releasably retaining said wireline cutter and said cutter actuator within said tubular body, said locking means being releasable from said tubular body to permit a wireline tool string to be passed through said tubular body.

4,886,116

NATURAL GAS PRODUCTION APPARATUS WITH BOTTOM-HOLE SEPARATOR

Clarence M. Garrison, 16 E. Main, Clarksville, Ark. 72830

Filed Jan. 9, 1989, Ser. No. 294,284
Int. Cl.[4] E21B *43/00*
U.S. Cl. 166—105.5 **16 Claims**

1. Apparatus for facilitating gas production in flooded or partially flooded wells having a casing extending from above to below the production zone and perforations at the production zone comprising

a well head device connected for receiving fluids from said well through the top of said casing,

a surface separator,

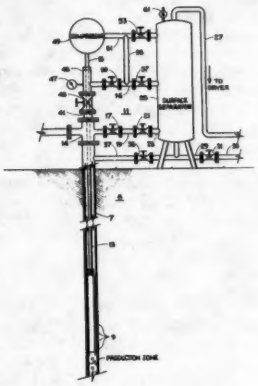
a conduit connecting said well head device to said surface separator and having at least one valve therein,

a gas compressor,

a tube having a diameter substantially less than the diameter of said casing located within said casing and extending from said production zone upward through said well head device to said gas compressor,

a conduit connected from said gas compressor to receive gas from said surface separator,

a cylinder having a diameter intermediate between the diameters of said tube and said casing and being open at the top end and closed at the bottom end and mounted concentrically to a bottom end portion of said tube and extending at least ten feet upwardly from the bottom thereof, and



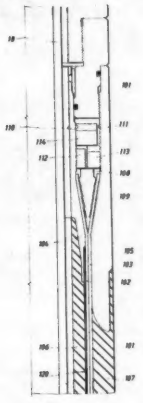
means for conducting a controllable portion of the liquid output from said surface separator back to the interior of said casing.

4,886,117

INFLATABLE WELL PACKERS

Dinesh R. Patel, Sugar Land, Tex., assignor to Schlumberger Technology Corporation, Houston, Tex.

Continuation of Ser. No. 922,628, Oct. 24, 1986, abandoned.
This application Nov. 2, 1988, Ser. No. 267,744
Int. Cl.[4] E21B *33/127*
U.S. Cl. 166—187 **7 Claims**



1. An inflatable well packer comprising:

a cylindrical mandrel;

a packer element comprising substantially tubular inner and outer elastomeric plies coaxially mounted on said mandrel, a protective sheath surrounding said inner ply which sheath is capable of resisting the forced extrusion of the

elastomeric material of said inner ply therethrough, and a reinforcing sleeve intermediate said protective sheath and said outer ply; and

coupling assemblies cooperatively coupling respective ends of said reinforcing sleeve to said mandrel, each of said coupling assemblies including inner and outer ring members coaxially mounted on said mandrel with facing surfaces defining an annular space for receiving the adjacent ends of said reinforcing sleeve and wedge member means positioned in said annular space for securing ends of said reinforcing sleeve between said inner and outer ring members, said wedge member means including tooth means for firmly gripping said ends of the reinforcing sleeve thereby preventing said wedge member means from slipping out of said annular space and wherein said inner ring members have respective thin walled end portions which extend between the corresponding ends of said inner elastomeric ply and said protective sheath, said respective end portions being flexible so as to be subject to being deformed outwardly relative to said mandrel in response to inflation of said packer element.

4,886,118

CONDUCTIVELY HEATING A SUBTERRANEAN OIL SHALE TO CREATE PERMEABILITY AND SUBSEQUENTLY PRODUCE OIL

Peter Van Meurs; Eric P. De Rouffignac; Harold J. Vinegar, and Michael F. Lucid, all of Houston, Tex., assignors to Shell Oil Company, Houston, Tex.

Continuation-in-part of Ser. No. 477,041, Mar. 21, 1983, abandoned, and a continuation-in-part of Ser. No. 658,850, Oct. 19, 1984, abandoned, and a continuation-in-part of Ser. No. 855,575, Apr. 25, 1986, abandoned, and a continuation-in-part of Ser. No. 943,240, Dec. 18, 1986, abandoned. This application Feb. 17, 1988, Ser. No. 157,349

Int. Cl.[4] C10B *53/06;* **E21B** *43/24, 43/30, 49/00*

U.S. Cl. 166—245 **39 Claims**

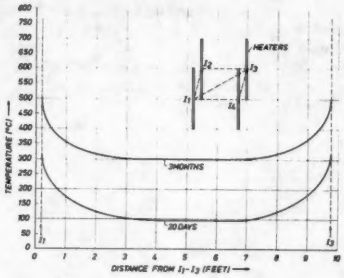
1. In a process in which oil is produced from a subterranean oil shale deposit by extending at least one each of heat-injecting and fluid-producing wells into the deposit, establishing a heat-conductive fluid-impermeable barrier between the interior of each heat-injecting well and the adjacent deposit, and then heating the interior of each heat-injecting well at a temperature sufficient to conductively heat oil shale kerogen and cause pyrolysis products to form fractures within the oil shale deposit through which the pyrolysis products are displaced into at least one production well, an improvement for enhancing the uniformity of the heat fronts moving through the oil shale deposit, which comprises:

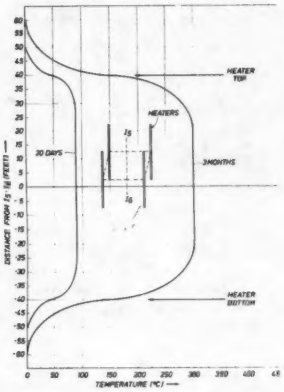
determining variations with depth in the composition and properties of the oil shale deposit;

completing said heat-injecting and fluid-producing wells selectively into a treatment interval of oil shale in which the oil shale deposit (a) is at least about 100 feet thick, (b) is substantially impermeable and free of mobile water, (c) has a composition and thickness such that the product of the average Fischer Assay grade times the thickness of the treatment interval is at least about 3,000 and (d) thereby contains components capable of interacting in a manner enhancing the uniformity of a front of conductively transmitted heat, with said wells being arranged so that, at least substantially throughout said treatment interval, the well boreholes are substantially parallel and are separated by substantially equal distances of about 30 to 100 feet; and

within the interior of each heat-injecting well maintaining an average temperature which, selectively along said treatment interval, is at least about 600° C., but is not high enough to thermally damage equipment within the well, while heat is being transmitted away from the well at a rate not significantly faster than that permitted by the thermal conductivities of the earth formations adjacent to the heated interval within the well.

22. A process for exploiting a target oil shale interval, by progressively expanding a heated treatment zone band from about a geometric center of the target oil shale interval outward, such that the formation or extension of vertical fractures





from the heated treatment zone band to the periphery of the target oil shale interval is minimized.

4,886,119

METHOD OF AND ARRANGEMENT FOR DRIVING VOLATILE IMPURITIES FROM GROUND

Bruno Bernhardt, Reutlingen-Betzingen; Anton Hessner, Reutingen, and Rainer Krug, Trochtelfingen, all of Fed. Rep. of Germany, assignors to Ieg Industrie-Engineering GmbH, Reutlingen, Fed. Rep. of Germany

Filed Aug. 3, 1988, Ser. No. 227,894

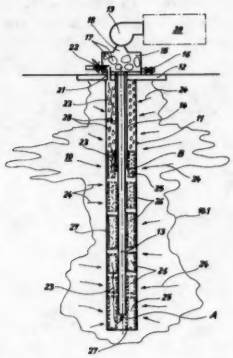
Claims priority, application Fed. Rep. of Germany, Aug. 25, 1987, 3728299

Int. Cl.[4] E21B *43/00*

U.S. Cl. 166—267 **20 Claims**

1. A method of driving volatile impurities from a ground with air, comprising the steps of forming in the ground a shaft with a gas permeable shaft wall; aspirating from outside of the shaft an afterflow air together with impurities containing gases; concentrating the aspiration in the shaft at a plurality of locations at different heights along the shaft in a region with expected high gas contents; extending a plurality of air afterflow passages from the earth surface through the shaft to the plurality of locations for supplying the afterflow air thereto; and

providing in the air afterflow passages a plurality of afterflow resistance means, respectively, for influencing a negative pressure value and a flow speed of the afterflow air in the region with expected high gas contents.



4,886,120

PROCESS FOR SECONDARY OIL RECOVERY UTILIZING PROPOXYLATED ETHOXYLATED SURFACTANTS IN SEAWATER

Russell D. Shupe, Ponca City, Okla., assignor to Conoco Inc., Ponca City, Okla.

Filed Feb. 1, 1989, Ser. No. 305,306
Int. Cl.[4] E21B *43/22*
U.S. Cl. 166—274 **6 Claims**

1. A process for enhancing the injectivity of an injection well and thereby accelerating the recovery of oil by a waterflood process from an oil-bearing subterranean formation penetrated by at least one injection well and at least one production well wherein the near wellbore area of the formation penetrated by the injection well has a low formation permeability to water as compared to the formation's absolute permeability, said method comprising:

(a) injecting into the formation through an injection well, seawater containing a surfactant in an amount effective to sweep the residual oil from the formation pore spaces in the near wellbore area and to thereby improve the water injectivity of said injection well, wherein the surfactant has the formula:

$$RO(C_3H_6O)_7(C_2H_4O)_2YX$$

wherein:

R is a mixture of alkyl groups containing from 12 to 15 carbon atoms,

Y is sulfate,

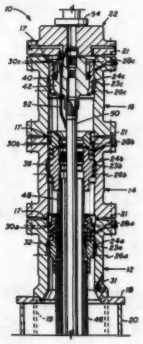
X is a monovalent cation; and thereafter injecting seawater into the formation through the injection well.

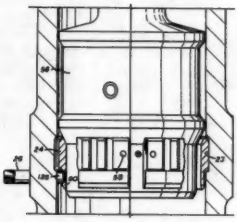
4,886,121

UNIVERSAL FLEXBOWL WELLHEAD AND WELL COMPLETION METHOD

Albert C. Demny; J. Matt Harwell; Reggie H. Etheridge, and Robert E. Bush, all of Houston, Tex., assignors to Seaboard-Arval Corporation, Houston, Tex.

Continuation of Ser. No. 139,905, Feb. 29, 1988, abandoned, which is a continuation of Ser. No. 941,784, Dec. 15, 1986, abandoned. This application Dec. 5, 1988, Ser. No. 279,926
Int. Cl.[4] E21B *23/00, 33/047*
U.S. Cl. 166—382 **11 Claims**





7. A method of providing a hanger for well pipe or the like in a wellhead housing, comprising the steps of:

(a) positioning a split flexible support ring in a releasably connected contracted position on a running tool with its outside diameter less than the inside diameter of a wellhead housing in which it is to be mounted;

(b) lowering the running tool with the support ring in the contracted position to a point in the wellhead housing opposite an annular recess in the bore of the housing;

(c) then engaging the support ring with locking means mounted in the wellhead housing while in position opposite the recess to prevent it from moving relative to the wellhead housing; and

(d) thereafter moving the running tool relative to the ring to release it from the support ring and to allow the support ring to expand radially outwardly into a seated position in the recess, but with a shoulder on the support ring extending into the bore of the housing to provide a support thereafter for a pipe hanger or the like;

(e) withdrawing the running tool from the wellhead housing; and

(f) lowering the pipe hanger into the wellhead housing and seating the hanger on the support ring.

4,886,122

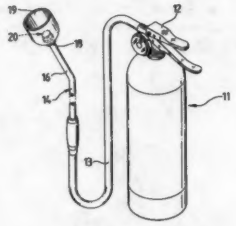
DRY CHEMICAL WAND

Fred B. Goodnight, Rte. 3, Box 751, Leeds, Ala. 35094

Filed Jul. 22, 1988, Ser. No. 222,792

Int. Cl.[4] A62C *13/24, 35/50;* **B05B** *1/26*

U.S. Cl. 169—74 **3 Claims**



1. A dispensing unit for use with a dry chemical firefighting agent stored in a reservoir under pressure comprising:

(a) a flexible hose operably connected to said reservoir to receive said fire fighting agent;

(b) an elongated tubular handle connected to said flexible hose for passing said firefighting agent therethrough in a concentrated stream, with said tubular handle being threaded along an end thereof distal said flexible hose and having threadedly mounted thereon a retaining nut, said tubular handle being bent proximal said threaded end;

(c) baffle means connected to said tubular handle distal said flexible hose and cooperatively positioned to deflect and dispense said concentrated stream of firefighting agent discharged axially of said tubular handle laterally thereof, and

(d) means for directing said deflected and dispersed stream into a defined region including a horn attached to the end of said tubular handle and having a wall radially offset from said baffle and extending axially beyond said tubular handle with said horn having an central aperture through which said threaded end of said handle extends and said baffle means comprises a threaded member engagable with said threaded end and a planar member affixed thereto and offset therefrom by a plurality of spacers such that a plurality of radial openings are provided between said planar member and said threaded member, with said horn secured between said retaining nut and said threaded member.

4,886,123

CONTROL DEVICE FOR POSITION-CONTROL OF IMPLEMENT COUPLED TO AN AGRICULTURAL VEHICLE

Arnold Winfried, Vaihingen/Enz; Horst Hesse, Stuttgart, and Werner Schumacher, Asperg, all of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

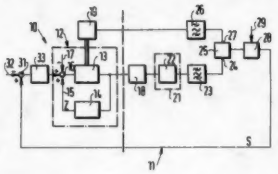
Continuation of Ser. No. 875,015, Jun. 13, 1986, abandoned. This application Jan. 7, 1988, Ser. No. 143,213

Claims priority, application Fed. Rep. of Germany, Jun. 26, 1985, 3522818

Int. Cl.[4] A01B *63/112*

U.S. Cl. 172—7 **9 Claims**

1. A control device for position-control of an implement coupled to an agricultural vehicle by a hoisting unit, particularly of a plow coupled to a tractor, the control device comprising a first control circuit including a drive speed sensor for detecting a speed of a drive of the vehicle and generating a drive speed signal, a differentiating device for processing said drive speed signal into a derivative acceleration signal; a true acceleration sensor fixedly mounted on the vehicle to detect true acceleration thereof relative to the ground and generate a true acceleration signal, a comparator for comparing the derivative and the true acceleration signals and generating a differential acceleration signal, an integrating device for processing said differential acceleration signal into an actual slip value, and a first summing means for comparing said actual slip value with a slip reference value and generating a slip control value; a second control circuit including a second summing means for



comparing an actual traction force value of the vehicle with a traction reference value and generating a position control value for said hoisting unit; and means for combining said slip control value from the first control circuit with the position control value of the second control circuit to affect via said hoisting unit the position of said implement.

4,886,124

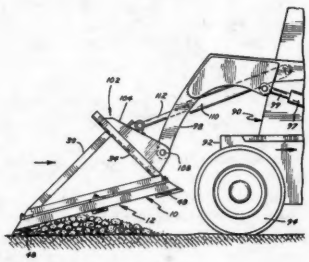
SOIL GRADING APPARATUS WITH SIFTING AND TRANSPORTING CAPABILITY

David W. Kleinhuizen, 18431 Henna Ave. North, Forest Lake, Minn. 55025

Filed Jan. 11, 1988, Ser. No. 141,977

Int. Cl.[4] A01B *17/00, 31/00*

U.S. Cl. 172—32 **16 Claims**



1. Soil grading apparatus comprising a generally rectangular frame forming an opening, means attached to said frame for engaging soil to be graded, grating means attached to said frame and extending across said opening at an elevation above said means for engaging the soil to be graded, said grating means having a plurality of openings therein for sifting sufficiently small particles of soil downwardly and retaining relatively large chunks and clods on top thereof, and means for tiltably mounting said frame on a vehicle, whereby movement of said frame by said vehicle across the soil to be graded at selected angles causes some of said soil, to be shoved onto the upper surface of said grating means while performing the soil grading function in which sufficiently small particles of soil are sifted downwardly and relatively large chunks and clods remain on top thereof.

4,886,125

ACCURATE LIGHTWEIGHT MANUAL LAWN AND GARDEN WEED CHIPPER

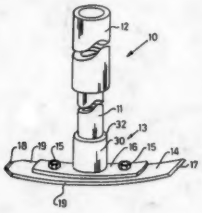
Hugh M. Reilly, P.O. Box 224, Runaway Bay, Gold Coast, Australia (4216)

Continuation of Ser. No. 796,019, Oct. 10, 1985, abandoned. This application Nov. 9, 1987, Ser. No. 119,266

Claims priority, application PCT Int'l Appl., Oct. 12, 1984, PCT/AU84/00199

Int. Cl.[4] A01B *1/10, 1/22*

U.S. Cl. 172—371 **8 Claims**



1. A gardening implement of the type having a lighweight tubular handle provided with a hand grip at its upper end and a mounting assembly at its lower end for a chipping blade disposed substantially normal to the axis of the handle, said mounting assembly including: an apertured elongate rectangular plate-like mounting member; a chipping blade detachably secured to said mounting member; a billet insert having an elongate body part which extends through a mounting aperture in said mounting member and into said tubular handle and an enlarged head part disposed externally of said handle which engages said mounting member about the periphery of said mounting aperture, and a separate external retaining sleeve supported about said lower end of said handle and frictionally retained in clamping engagement by said billet whereby, said mounting assembly is securely held together.

4,886,126

METHOD AND APPARATUS FOR FIRING A PERFORATING GUN

Donald N. Yates, Jr., Cape Carancahua, Tex., assignor to Baker Hughes Incorporated, Houston, Tex.

Filed Dec. 12, 1988, Ser. No. 282,595

Int. Cl.[4] E21B *43/117, 43/1185*

U.S. Cl. 175—4.54 **7 Claims**

1. In a mechanism for electrically firing a tubing supported perforating gun in a subterranean well comprising:

a housing insertable in the tubing and releasably securable to the perforating gun, said housing containing a power supply, electrical means for generating an electrical gun firing pulse and a mechanical switch for connecting said power supply to said electrical means;

a hydrostatic pressure responsive rupture disc forming a wall of said housing;

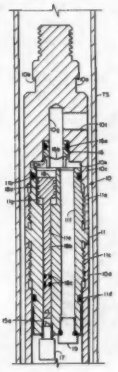
a cylinder mounted within said housing, whereby the rupture of said rupture disc by increasing the fluid pressure in the tubing permits said fluid pressure to be applied to said cylinder; and

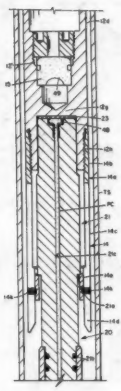
a piston slidably and sealably mounted in said cylinder and operatively connected to said mechanical switch to close same in response to the rupture of said rupture disc.

5. The method of firing a perforating gun in a subterranean well under optimum fluid pressure conditions surrounding the perforating gun comprising the steps of:

suspending the perforating gun adjacent a production formation by a tubing string extending to the well surface, said tubing string incorporating a packer engagable with the well bore above said perforating gun;

disposing a hollow housing adjacent to said perforating gun and having its interior isolated from well fluids by a fluid pressure operated valve responsive to a first level of pressure of fluid surrounding said perforating gun, said housing containing an electrical power source, a fluid pressure transducer, a microprocessor and an electrical firing pulse generator;





connecting said power source to said microprocessor in response to the opening of said valve; and,

energizing said electrical firing pulse generator by said microprocessor in response to a signal from said fluid pressure transducer indicating the existence of a second preselected fluid pressure level surrounding said perforating gun.

4,886,127

APPARATUS FOR FIRING BOREHOLE PERFORATING APPARATUS

Thomas D. Ricles, Kingwood, and Gary R. Domstead, Angleton, both of Tex., assignors to Dresser Industries, Inc., Dallas, Tex.

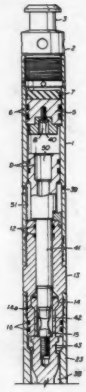
Filed Nov. 23, 1988, Ser. No. 275,300

Int. Cl.[4] E21B *43/11*

U.S. Cl. 175—4.54 **15 Claims**

1. In a pressure actuated apparatus for firing a perforating gun disposed in a tubing string within a borehole having an

elongated housing and an arming means including a piston moveable in a fluid chamber and fixed to said housing by a shear member which is shearable in response to the fluid pressure within said tubing string, a striker fixed to said piston and



spring biased to move in a direction for firing said perforating gun, the improvement comprising first means for protecting said shear member from any tensile force due to said spring bias.

4,886,128

RAM BORING IMPLEMENT HAVING A MOVABLE BIT

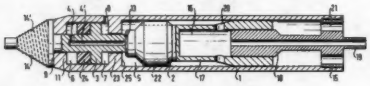
Helmuth Roemer, Attendorner Str. 135, 5950 Finnentrop-Heggen, Fed. Rep. of Germany

Filed Mar. 28, 1988, Ser. No. 173,783

Claims priority, application Fed. Rep. of Germany, Mar. 27, 1987, 3710162

Int. Cl.[4] E21B *4/14*

U.S. Cl. 175—19 **14 Claims**



1. A ram boring implement for driving earth bores comprising:

a housing;

a control sleeve disposed within said housing, means for securing said control sleeve to said housing, said securing means having at least one opening extending therethrough to allow fluid communication between the interior and the exterior of said housing;

a fluid driven percussion piston reciprocally movable axially on the control sleeve within said housing;

an axially movable bit connected to one end of said housing, said bit being directly or indirectly acted upon by the percussion piston in response to resistance acting against the bit;

a restoring piston being connected to the bit; and

means for subjecting a side of said restoring piston which is remote from the percussion piston to fluid pressure produced during a rearward stroke of the percussion piston.

4,886,129

WELL DRILLING OPERATION CONTROL PROCEDURE

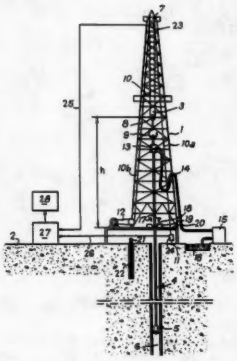
Jean C. Bourdon, Montrouge, France, assignor to Schlumberger Technology Corporation, Houston, Tex.

Filed Feb. 26, 1988, Ser. No. 160,955

Claims priority, application France, Feb. 27, 1987, 87 02628

Int. Cl.[4] E21B *47/00*

U.S. Cl. 175—40 **6 Claims**



1. A test procedure carried out during well drilling operations for monitoring rotary type well (6) drilling operations, by means of a drill string (4) fitted at its lower end with a bit (5) and suspended by its upper end, at the surface, from a hook (9) from the drill rig (1) comprising:

applying a certain initial weight to the bit (5);

keeping the hook (9) att the same height h throughout the test;

maintaining the rate of turn ROT of the drill string (4) more or less constant throughout the test;

measuring variations in the weight applied to the bit (WOB_m) at the surface by means of the measurement of the weight suspended from the hook (9) and recording said measurements as a function of the time, t, wherein the values of WOB_m decrease roughly exponentially as a function of time t;

from said exponential function, determining, for a time considered as infinite, a threshold value representing the value of the loss of weight applied to the bit between the surface and the bit; and

determining from the values of WOB_m measured and recorded as a function of time t, at least one of the parameters selected from the group consisting of: a parameter, a, representing the drillability of the formation and the bit wear, and the value of the actual weight applied to the bit (WOB_e), said value of the actual weight applied to the bit being derived from the expression $WOB_e = WOB_m - \text{threshold}$.

4,886,130

NUTATIONAL TECHNIQUE FOR LIMITING WELL BORE DEVIATION

Robert F. Evans, 12820 Montfort, #150, Dallas, Tex. 75230

Filed Jul. 26, 1988, Ser. No. 224,464

Int. Cl.[4] E21B *7/10, 17/10*

U.S. Cl. 175—73 **10 Claims**

1. A drill tool for use in a rotary drill string at a predetermined location spaced above a drill bit connected to the bottom of the drill string, said drill tool operatively reducing or eliminating the deviation of the well bore from vertical as the well bore is advanced by the drill bit during rotation of the drill string, said drill tool comprising:

deflection means connected to the drill string at the prede-

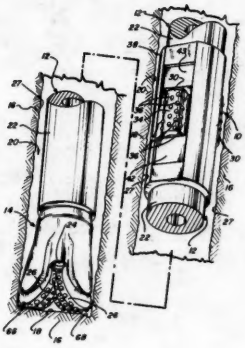
termined location for periodically contacting the low side of a side wall of a well bore which deviates from vertical and for inducing a lateral deflection of the drill string away from the low side of the side wall as the drill string rotates to create a partial nutating effect in the drill string; and

connection means for connecting the deflection means in the drill string at the predetermined location spaced above the drill bit to cause the lateral deflection and the partial nutating effect to bow the drill string away from the low side and to angle the lower portion of the drill string and drill bit toward vertical; and

said deflection means further comprises:

a roller rotationally connected to the drill string at a position to rotate against the low side of the side wall as the drill string rotates; and

means for periodically radially extending the roller as it comes in contact with the low side to force the drill string away from the low side and induce the lateral deflection in the drill string.



4,886,131

INCLINED-JET DRILLING TOOL

Henri Cholet, Le Pecq, and Christian Bardin, Bois Colombes, both of France, assignors to Institut Francais du Petrole, Rueil Malmaison, France

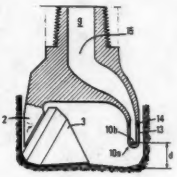
PCT No. PCT/FR87/00522, § 371 Date Aug. 31, 1988, § 102(e) Date Aug. 31, 1988, PCT Pub. No. WO88/05107, PCT Pub. Date Jul. 14, 1988

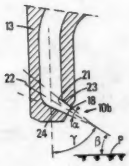
PCT Filed Dec. 30, 1987, Ser. No. 257,308

Claims priority, application France, Dec. 31, 1986, 86 18415

Int. Cl.[4] E21B *10/18*

U.S. Cl. 175—340 **17 Claims**





1. A ground drilling tool comprising:

a tool body means rotationally driven by a tool holder means,

a cavity means provided in the tool body means for receiving a pressurized fluid through the tool holder means,

a plurality of revolving parts held by the tool body means and provided with teeth means along a working face of the drilling tool for biting into the ground,

irrigation means for delivering at least one jet of irrigation fluid directed at the working face of the drilling tool, said irrigation means having at least one first calibrated orifice means in the tool body means communicating with the cavity means in the tool body means and terminating in a first space between two adjacent rotating parts, said calibrated orifice means being adapted to produce a jet of fluid directed at one of the two revolving parts between which said first space is defined, a center of said jet of fluid emerging from said calibrated orifice means being located at a distance d from a plane perpendicular to and axis of the drilling tool passing through tips of the teeth means considered from the working face side, and

wherein a diameter of the tool, a height of the teeth means, and said distance d are determined in accordance with the following relationship:

$$d > 1.8H \text{ and}$$

$$0.125D < d < 0.185D,$$

where:

D=a diameter of the drilling tool; and

H=a height of the teeth means.

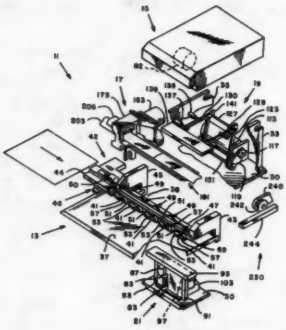
4,886,132
CUTTER MODULE FOR A MODULAR MAILING MACHINE

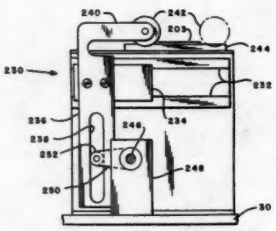
Hugh S. Dannatt, Bethel, Conn., assignor to Pitney Bowes Inc., Stamford, Conn.

Continuation of Ser. No. 135,107, Dec. 18, 1987. This application Feb. 27, 1989, Ser. No. 316,269

Int. Cl.[4] G01G *23/38, 23/22;* B41L *47/46*

U.S. Cl. 177—4 2 Claims





1. A mailing machine comprised of a plurality of modules, each of said modules mounted in said mailing machine to perform a single process station, said mailing machine having a base and a plurality of support walls, wherein said modules comprises:

a scale module having means for weighing an envelope;

a transport module having means for positioning said envelope in said process station and ejecting said envelope from said process station;

a meter module having a registration area and a printing means located in said registration area for imprinting an indicia on said envelope, said registration area being vertically aligned to and spaced above said recess in said weighing plate;

a platen module having a platen plate and elastomeric member flexibly mounted to a first surface of said platen plate,

platen support means for supporting said platen plate such that said elastomeric member is opposite said registration area of said meter module and such that said platen plate can be selectively positioned in a first position wherein said elastomeric member is in close proximity to said printing means of said meter module and a second position wherein said elastomeric member is positioned generally below said weigh plate of said scale module, and

a tape module, including,

a tape track,

support means for supporting said tape track in a generally cantilevered manner;

tape positioning means for selectively positioning said support means in a first position and in a second position longitudinally removed from said first position;

tape feed means for selectively feeding one of a plurality of imprinting tapes to and through said tape track such that said fed imprinting tape resides within said tape track when said tape track is in said second position; a cutter module including,

a cutter support member slideably mounted to one of said mailing machine support walls such that said cutter support member can be slideably displaced longitudinally transverse to said end of said tape track of said tape module;

a rotary cutter blade rotatably mounted to said cutter support member;

means for reciprocally displacing said cutter support member transverse to said tape track of said tape module, said means being in communication with said motor such that said cutter support member is reciprocated in response to rotational displacement of said motor in a second direction; and,

means for providing cutting surface coactive with said rotary cutter blade.

4,886,133
ELECTROMECHANICAL SCALE

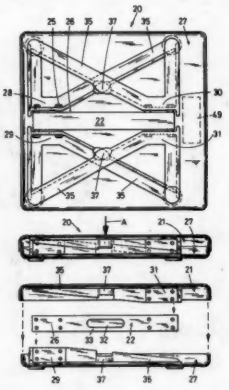
Jürgen Horn, Schwülper-Lagesbüttel, and Walter Kitzing, Solingen, both of Fed. Rep. of Germany, assignors to Robert Krups Stiftung & Co. KG, Solingen, Fed. Rep. of Germany

Filed Oct. 5, 1988, Ser. No. 254,265

Claims priority, application Fed. Rep. of Germany, Oct. 8, 1987, 3733961

Int. Cl.[4] G01G *3/14, 3/08*

U.S. Cl. 177—211 37 Claims



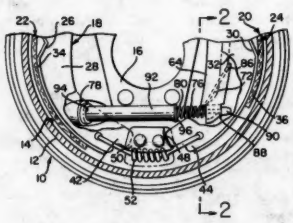
1. An electromechanical weighing scale, comprising a base; a load receiving and transmitting member above said base; a deformable carrier having a predetermined height and disposed above said base and beneath said member, said carrier having at least one lateral surface and being at least partially confined within at least one of the parts including said member and said base so that the overall height of that portion of the scale which includes said carrier, said base and said member does not appreciably exceed said predetermined height; at least one deformation-responsive signal generator operatively connected with said carrier; and means for deforming said carrier, including means for connecting said lateral surface of said carrier to said member.

4,886,134

BLIND CABLE ASSEMBLY

Mayjue A. Yamamoto, Yellow Springs, Ohio, assignor to General Motors Corporation, Detroit, Mich.

Filed Dec. 19, 1988, Ser. No. 286,109
Int. Cl.[4] F11D *51/00*
U.S. Cl. 188—20 3 Claims



1. In a blind cable assembly, a lever adapted to be pivotally moved to actuate a drum brake mechanism enclosed by a brake drum and a backing plate, said lever having one end formed to an open "J" shape with substantially parallel sides forming an axially extending, upwardly open, channel at the bottom of the "J", said channel having having an open receiving end and an open other end, and a ramp surface on the upper end of the one parallel side terminating in a free end; and a notch in one edge of said lever above said open other end;

a compression coil spring forming a lever return spring and a guide member, said coil spring having one end coil in abutting engagement with said channel sides at said open receiving end and having its other end operatively secured to and grounded for reaction on the backing plate around a backing plate opening so that said coil spring continually urges said lever in a brake released direction, said coil spring having a retaining ramp section extending from the upper side of said one end coil axially and laterally upward above said channel, and a hook end formed on the other end of said retaining ramp section from said one end coil, said hook end being received in said notch to hold said coil spring securely to said lever one end;

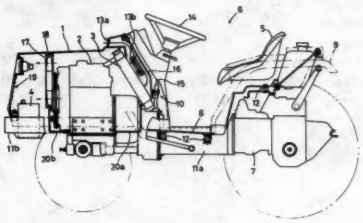
and a brake cable having a button on one end thereof, said cable being adapted to be tensioned to actuate the drum brake mechanism, said brake cable being blind-assembled to said lever by being inserted through through the backing plate opening into and through said coil spring and moved axially into camming engagement with said channel side ramped upper edge, said spring retainer ramp section and said backing plate and the side of said parking brake lever above said channel guiding and deflecting said button and a portion of said cable adjacent thereto laterally upward and axially past said channel, side loading said cable and storing a spring-like force therein, until said button has moved beyond said channel side edge ramp and the edges of said channel sides forming said channel open other end, the spring-like force stored in said cable then moving said cable and said button laterally so that said cable is positioned within said tapered channel near said channel bottom and said button is in abutting engagement with the edges of said channel sides forming said channel open other end, tensioning of said cable for brake application then being transmitted to said lever through said button to actuate the drum brake.

4,886,135

ENGINE COOLING STRUCTURE FOR AGRICULTURAL TRACTOR

Tadashi Nakamura; Satoshi Fujita, and Eiichi Ishida, all of Sakai, Japan, assignors to Kubota, Ltd., Osaka, Japan

Filed Apr. 27, 1988, Ser. No. 186,842
Int. Cl.[4] B60K *5/02*
U.S. Cl. 180—68.1 16 Claims



1. An engine cooling structure for a vehicle, comprising:

an engine (2) in an engine compartment located in a forward portion of the vehicle;

a driver's seat located in a rearward portion of said vehicle;

a hood (1) having top, side and front portions forming said engine compartment;

a radiator (3) disposed rearwardly of said engine (2) and forwardly of a steering wheel and steering shaft, the rearward end of the top of said hood being connected to an upper portion of said radiator;

a cooling fan (17) disposed forwardly of said engine (2) and remotely from said radiator for drawing cooling air and exhausting the cooling air in a forward direction;

a shroud (18) surrounding said cooling fan (17);

an air inlet duct formed by a guide plate disposed between said radiator and said steering wheel and steering shaft, a lower end of said guide plate being connected to a lower portion of said radiator, said air inlet duct including an air inlet opening formed by an upper end of said guide plate extending over a rearward portion of the top of said hood;

a first shielding plate (20*a*) connected at one end to the lower portion of said radiator (3) and connected at a rear portion of said engine;

a second shielding plate (20*b*) connected at one end to a forward portion of said engine and connected at an opposite end to a lower portion of said shroud (18);

said first and second shielding plates sealing said engine compartment from below, thereby forming an air duct extending from said radiator (3) over and along said engine to said cooling fan (17); and

an air outlet (19) formed in said hood at the front of said engine compartment, wherein the cooling air flows through the radiator (3), past the engine (2) through the cooling fan (17) and out the engine compartment via air outlet (19).

4,886,136

MOTOR-DRIVEN TYPE POWER ASSISTED STEERING CONTROL APPARATUS

Hajime Kozuka, Okazaki; Naoki Saito, Maebashi; Mitsuharu Morishita, and Shinichi Kohge, both of Himeji, all of Japan, assignors to Mitsubishi Denki Kabushiki Kaisha and Nippon Seiko Kabushiki Kaisha, both of Tokyo, Japan

Filed Dec. 22, 1987, Ser. No. 136,757
Claims priority, application Japan, Dec. 26, 1986, 61-313213
Int. Cl.[4] B62D *5/04*
U.S. Cl. 180—79.1 5 Claims

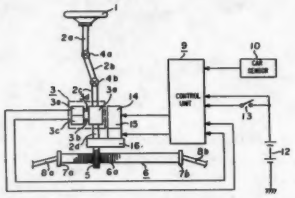
1. A motor-driven type power assisted steering control apparatus in a steering system having a rack which comprises:

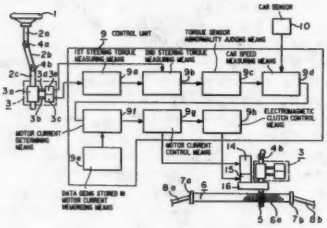
a speed sensor for detecting car speed;

a torque sensor comprising torque-displacement converting means disposed on a steering shaft for converting a torque of steering into an amount of displacement of said torque-displacement converting means, at least one displacement conveying means for mechanically transmitting the amount of displacement of said torque-displacement converting means, and first and second displacement-electric signal converting means for converting the amount of displacement given by said displacement conveying means into electric signals;

a d.c. motor;

an electromagnetic clutch directly connected to the output shaft of said d.c. motor and operatively connected to said rack; and





control unit having means for receiving electric output signals from said speed sensor and said first and second displacement-electric signal converting means, means for judging whether a difference in value between the electric output signals from said first and second displacement-electric signal converting means is higher than a predetermined signal value, and means for deenergizing said d.c. motor and said electromagnetic clutch based on the judgment that said torque sensor is abnormal, when said difference in value is higher than said predetermined value, whereby an auxiliary torque of said d.c. motor is disconnected from said steering shaft.

4,886,137

ELECTROMAGNETIC CONTROL APPARATUS FOR VARYING THE DRIVER STEERING EFFORT OF A HYDRAULIC POWER STEERING SYSTEM

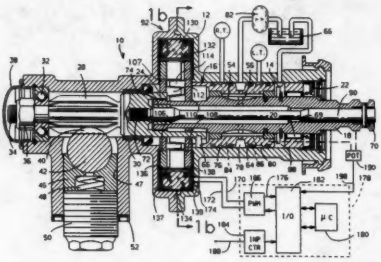
Andrzej M. Pawlak, Troy; David W. Graber, Millington, and Jeffery A. Zuraski, Saginaw, all of Mich., assignors to General Motors Corporation, Detroit, Mich.

Filed Dec. 22, 1988, Ser. No. 288,662
Int. Cl.[4] B62D 5/083
U.S. Cl. 180—142 **8 Claims**

1. In a vehicular power assist steering system having first and second relatively rotatable hydraulic elements connected between a driver manipulated steering shaft and a steering gear for generating hydraulic flow in relation to their relative rotation, apparatus for variably coupling said hydraulic elements to vary the level of steering assist produced for a given driver manipulation of said steering shaft, comprising:

mechanical resilient means connected between said relatively rotatable hydraulic elements for developing a mechanical centering force in relation to such relative rotation which tends to restore said elements to a centered condition of minimum hydraulic flow; and

electromagnetic circuit means including an energized coil and first and second toothed flux conducting elements magnetically coupled to said coil and supported for rotation with said first and second hydraulic elements, respectively, to define a magnetic circuit having a working air gap which varies with the relative rotation of said hydraulic elements, the flux conducting elements being angularly oriented such that the teeth of one element are equally attracted to juxtaposed teeth of the other element when said hydraulic elements are in said centered condition, whereby when said hydraulic elements are relatively displaced from said centered condition, the coil and flux conducting elements develop a net magnetic attractive force which opposes the mechanical centering torque in relation to the energization of said coil.

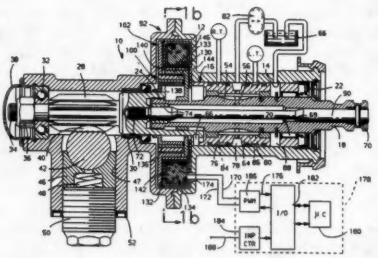


4,886,138

ELECTROMAGNETIC CONTROL APPARATUS FOR VARYING THE DRIVER STEERING EFFORT OF A HYDRAULIC POWER STEERING SYSTEM

David W. Graber, Millington; Andrzej M. Pawlak, Troy, and Jeffery A. Zuraski, Saginaw, all of Mich., assignors to General Motors Corporation, Detroit, Mich.

Filed Dec. 22, 1988, Ser. No. 288,661
Int. Cl.[4] B62D 5/083
U.S. Cl. 180—142 **14 Claims**



9. In a vehicular power assist steering system wherein a pair of relatively rotatable hydraulic elements are connected between a driver manipulated steering shaft and a steering gear such that driver steering effort applied to said steering shaft produces a relative rotation of said hydraulic elements for

generating hydraulic flow in relation to the desired level of power assist steering force, apparatus for rotatably coupling said hydraulic elements, comprising:

mechanically resilient means coupling the rotary hydraulic elements to develop a mechanical centering force which is rotationally balanced in the centered relative position of said rotary magnetic elements, but which resists relative rotation therefrom;

permanent magnetic means supported for rotation with one of said pair of hydraulic elements to define a rotary set of alternate polarity permanent magnetic poles;

electromagnetic means including an exciting coil and an encircling core having a set of alternate polarity electromagnetic pole elements disposed in close proximity to said permanent magnetic poles, the electromagnetic pole elements being supported for rotation with the other of said pair of hydraulic elements relative to said permanent magnetic poles such that the minimum reluctance electromagnetic flux path therebetween occurs when said hydraulic elements are in a centered relation for minimum hydraulic flow; and

control means for energizing said exciting coil with direct current to control the magnetic polarity and strength of said electromagnetic poles, whereby the electromagnetic and permanent magnet poles cooperate to produce a variable magnetic centering torque in relation to the displacement of said hydraulic elements and the energization of said exciting coil, and the overall coupling between the hydraulic elements is defined by the combination of said magnetic and mechanical centering torques.

4,886,139

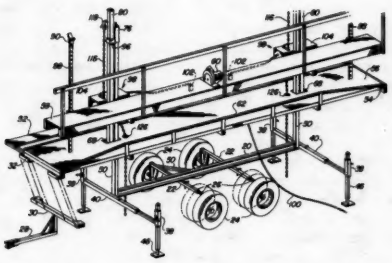
MOBILE SCAFFOLD WITH POWER-OPERATED PLATFORM ELEVATION

Gaston L. Dupont, and Andre G. Dupont, both of 30 Charles St., Holyoke, Mass. 01040

Filed Aug. 19, 1988, Ser. No. 234,353

Int. Cl.[4] E04G *1/20*

U.S. Cl. 182—146 **14 Claims**



1. A scaffold structure, comprising an elongated horizontal base having opposite ends, ground-engaging means supporting the base above the ground, a pair of masts spaced apart lengthwise of and rigidly affixed to the base, a platform superimposed over the base, a pair of guide means fixed to the platform and spaced apart according to the masts and cooperating respectively with the masts for guiding the platform for vertical movement relative to the masts, and power-operated means carried by the platform and including driven elements respectively cooperative with the mast for effecting vertical movement of the platform relative to the base and masts; in which the driven element of each power-operated means is rotary and a flexible member engages the rotary element and is connectible to a part of the respective mast at an elevation above the platform and actuation of the power means causes each rotary element to selectively ascent and descend its flexible member for changing the elevation of the platform; including a pair of power-operated means, each having a rotary element cooperating with a flexible element as aforesaid; and, in which at least one of the power-operated means is selectively positionable on the platform between two modes, in one of which its flexible element extends vertically for connection to its mast and in the other of which its flexible element extends horizontally for connection to an object relatively remote from the base.

4,886,140

DEVICE FOR CONTROLLING THE DRIVE TORQUE OF A MOTOR VEHICLE

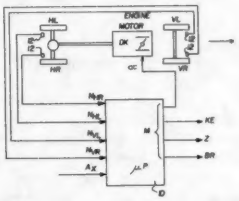
Heinz Leiber, Oberriexingen; Hans-Joachim Ohnemüller, Reutlingen, and Klaus Kastner, Stuttgart, all of Fed. Rep. of Germany, assignors to Daimler Benz AG, Stuttgart, Fed. Rep. of Germany

Filed Aug. 29, 1988, Ser. No. 237,382

Claims priority, application Fed. Rep. of Germany, Aug. 27, 1987, 3728574

Int. Cl.[4] B60K *27/00*

U.S. Cl. 180—197 **12 Claims**



1. Device for controlling at least one variable influencing the drive torque of a motor vehicle, depending on signals of generating means for generating speed and acceleration signals of all driven wheels and of the vehicle and for generating a slip threshold for monitoring the driven wheels and having a control variable which is the difference between wheel acceleration and vehicle longitudinal acceleration comprising:

means for providing a positive control threshold value and a negative control threshold value;

first torque means for reducing the drive torque when the control variable exceeds said positive control threshold value, and for increasing the drive torque when the control variable falls below said negative control threshold value;

slip means for changing the slip threshold in the same direction as the course of the vehicle longitudinal acceleration in response to a driven vehicle wheel exceeded the slip threshold;

a first time window means for providing a first time window which is set by the wheel speed falling below the slip threshold;

a second torque means for increasing the drive torque in addition to said first torque means by a value associated with the product of the current vehicle longitudinal acceleration and the ratio of slip threshold minus vehicle speed to wheel speed minus vehicle speed if the slip threshold is not exceeded again by the driven wheel speed within the first time window after falling below this slip threshold;

a second time window means for providing a second time window which is set, or set again respectively, with each increases of the drive torque; and

third torque means for increasing the drive torque in addition to said first torque means if the slip threshold is not exceeded by a driven wheel speed within the second time window.

4,886,141

FOUR WHEEL DRIVE VEHICLE

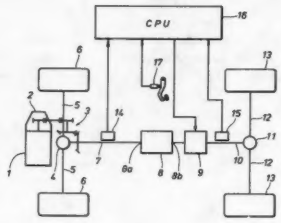
Hiroshi Ikegami; Tetsuji Muto; Tetsuro Hamada; Katsuhiko Masuda; Kazuhiko Shimada, and Kazunori Shibuya, all of Wako, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Jun. 8, 1988, Ser. No. 203,970

Claims priority, application Japan, Jun. 8, 1987, 62-142830; Jun. 29, 1987, 62-161481

Int. Cl.[4] B60K *17/34*

U.S. Cl. 180—233 12 Claims



1. A multi-axle drive vehicle, comprising:

a first axle directly coupled to a power source;

a second axle coupled to the power source by way of coupling means for transmitting torque as a mathematical function of a difference in rotational speed between an input end and an output end of the coupling means;

clutch means for selectively interrupting transmission of power from the power source to the second axle;

brake sensor means for detecting activation of a brake system of the vehicle;

a rotational speed sensor means for detecting a difference in rotational speed between the input end and the output end of the coupling means; and

control means for activating the clutch means relative to an output from the brake sensor means and an output from the rotational speed sensor means.

4,886,142

HYDRAULIC FOUR-WHEEL DRIVE SYSTEM

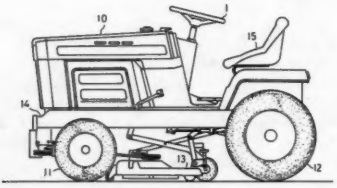
Kojiro Yamaoka, Nishinomiya; Toshiro Azuma, Minoo; Kazuhiko Yano, Toyonaka, and Ryota Ohashi, Kobe, all of Japan, assignors to Kanzaki Kokyukoki Mfg. Co. Ltd., Japan

Filed Jun. 27, 1988, Ser. No. 211,912

Claims priority, application Japan, Jun. 26, 1987, 62-160648; Jun. 26, 1987, 62-160649; Jun. 26, 1987, 62-160650; Jun. 26, 1987, 62-160651; Jun. 27, 1987, 62-160687

Int. Cl.[4] B60K *17/356*

U.S. Cl. 180—242 6 Claims



1. A hydraulic drive system for a vehicle having at least one driving wheel and at least one steering wheel, comprising:

a variable capacity motor including a swash plate and a motor shaft;

a steering handle connected to said swash plate;

a steering wheel differential gear driven by said motor shaft for driving the steering wheel of said vehicle;

a fixed capacity motor;

a driving wheel differential connected to said fixed capacity motor for driving the driving wheel of said vehicle;

a hydraulic supply means, said hydraulic supply means comprising a variable capacity pump connected to an engine, wherein said hydraulic supply means connects said variable capacity motor with said capacity motor;

said swash plate, in association with said steering handle, varies the rotation of said motor shaft, when said steering handle is turned, said steering wheel changes speed corresponding to a turning radius of said steering handle.

4,886,143

HUNTER'S TREE STAND

Donald J. Dubroc, 2008 Roosevelt Blvd., Kenner, La. 70062

Filed Feb. 28, 1989, Ser. No. 316,645

Int. Cl.[4] A45F *3/26;* A01M *31/02*

U.S. Cl. 182—142 18 Claims

1. An apparatus for engaging substantially upright columnar members, including trees, for supporting a person above the ground comprising:

(a) a support means having a generally vertical region and a generally horizontal region, said vertical and horizontal regions being contiguous for the transfer of loading forces between them;

(b) bracing means attached to a lower end of said generally vertical region for bracing said support means against a columnar member, said bracing means being, when loaded, under compressive forces;

(c) securing means attached to said support means above said bracing means for securing said support means to said columnar member, said securing means being, when loaded, under tensile forces; and,

(d) suspension means for suspending a seat member from said support means, said suspension means secured to said generally horizontal region with said seat member being configured to support a load therefrom.

4,886,144

LUBRICATING APPARATUS FOR BEARINGS

Ulf Wengeler, Halmstad, Sweden, assignor to SKF Mekanprodukter AB, Katrineholm, Sweden

Filed Jun. 20, 1988, Ser. No. 208,688

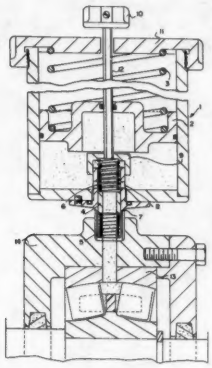
Claims priority, application Sweden, Jun. 23, 1987, 8702597

Int. Cl.[4] F01M *1/18;* F16N *11/04, 29/00*

U.S. Cl. 184—45.1 5 Claims

1. An apparatus for automatic lubrication of bearings mounted to sense bearing housing temperature, comprising a housing (1) defining a reservoir for lubricant, a spring actuated piston (2) for discharging lubricant at a discharge end of said housing, a valve assembly (7) at said discharge end having an elongated hollow housing with discharge openings (8) communicating with said lubricant reservoir, a substantially tubular valve body (4) slidably mounted for axial movement in said valve housing, spring biasing means (5, 6) acting on opposing

ends of said valve body (4), at least one of said springs (5) being in the form of a memory metal spring (5) positioned to sense the temperature of the bearing housing and to expand when a predetermined activation temperature is exceeded to thereby



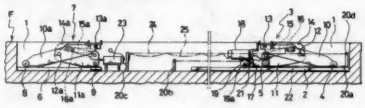
cause the memory metal spring (5) to move the valve body (4) in the valve member housing (7) to a position closing said openings to interrupt the supply of lubricant to the bearing housing said biasing means normally positioning said valve (4) in an open position permitting flow of lubricant.

4,886,145

UNDERGROUND VEHICLE LIFT

Kunimitsu Iwahashi, Handa, Japan, assignor to Sugiyasu Industries Co., Ltd., Japan

Filed Jul. 8, 1988, Ser. No. 216,369
Claims priority, application Japan, Jul. 10, 1987, 62-106538
Int. Cl.[4] B60S *13/00*
U.S. Cl. 187—8.71 **8 Claims**



1. An underground vehicle lift comprising

(a) at least first and second vertically expanding and contracting jack assemblies disposed in a pit in a mutually juxtaposed relation and each including a pair of parallel link mechanisms,

(b) first and second rails provided at the bottom of the pit,

(c) a first roller provided on a first link of each of the link mechanisms of the first jack assembly and rollably supported on one of the first rails,

(d) a second roller provided on a second link of each of the link mechanisms of the first jack assembly and rollably supported on one of the first rails,

(e) a third roller provided on a link of each of the link mechanisms of the second jack assembly and rollably supported on one of the second rails,

(f) a vehicle supporting table supported horizontally on each of the jack assemblies,

(g) means for vertically expanding and contracting the link mechanisms of the first jack assembly together to expand and contract the first jack assembly, thereby raising and lowering its table, the first rollers being rolled on the first rail when the first jack assembly is expanded and contracted,

(h) means for vertically expanding and contracting the link mechanisms of the second jack assembly together to expand and contract the second jack assembly, thereby raising and lowering its table, the third rollers being rolled on the second rails when the second jack assembly is expanded and contracted,

(i) driving means connected to the first jack assembly for moving the first jack assembly horizontally along the first rails toward and away from the second jack assembly, both the first and second roller being rolled on the first rails when the first jack assembly is moved horizontally,

(j) a first fixing means for temporarily preventing the second rollers from rolling on the first rails, thus enabling the first jack assembly to be expanded and contracted in a selected fixed position on the first rails as well as enabling the entire first jack assembly to be fixed on the first rails when the first jack assembly is in an expanded position, and

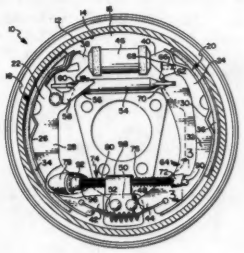
(k) a second fixing means for permanently preventing the second jack assembly from moving horizontally.

4,886,146

BLIND CABLE ASSEMBLY

Douglas M. Copp, West Milton, Ohio, assignor to General Motors Corporation, Detroit, Mich.

Filed Dec. 19, 1988, Ser. No. 286,114
Int. Cl.[4] F16D *51/00*
U.S. Cl. 188—2 D **3 Claims**



1. In a blind cable assembly, a lever adapted to be pivotally moved to actuate a drum brake mechanism enclosed by a brake drum and a backing plate, said lever having one end formed to an open "J" shape with non-parallel sides forming an axially and upwardly tapered, upwardly open, channel at the bottom of the "J", said channel having an open receiving end and a smaller open other end and a notch in one edge of one of said sides near the upper part of said smaller open end;

a compression coil spring forming a lever return spring and a guide member, said coil spring having one end coil in abutting engagement with said channel sides at said open receiving end and having its other end operatively secured to and grounded for reaction on the backing plate around a backing plate opening so that said coil spring continually urges said lever in a brake released direction, said coil spring having a ramp section extending from said one end coil axially and laterally upward through said channel, and a hook end formed on the other end of said ramp section from said one end coil, said hook end being received in said notch to hold said coil spring securely to said lever one end;

and a brake cable having a button on one end thereof, said cable being adapted to be tensioned to actuate the drum brake mechanism, said brake cable being blind-assembled to said lever by being inserted through the backing plate opening into and through said coil spring and moved axially into said channel, said spring ramp section and said channel sides guiding and deflecting said button and a portion of said cable adjacent thereto laterally upward and axially through said channel, side loading said cable

and storing a spring-like force therein, until said button as moved beyond said ramp section and the edges of said channel sides forming said channel smaller open end, the spring-like force stored in said cable then moving said cable and said button laterally so that said cable is positioned in the bottom of said tapered channel and said button is in abutting engagement with the edges of said channel sides forming said channel smaller open end, tensioning of said cable for brake application then being transmitted to said lever through said button to actuate the drum brake.

4,886,147

BRAKE ARRANGEMENT

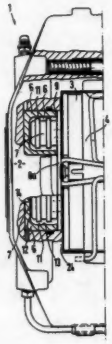
Wilhelm Kroniger, Friolzheim; Roland Martin, Weissach, and Guenter Aydt, Backnang, all of Fed. Rep. of Germany, assignors to Dr. Ing. H.c.F. Porsche AG, Weissach, Fed. Rep. of Germany

Filed Dec. 19, 1988, Ser. No. 286,165

Claims priority, application Fed. Rep. of Germany, Dec. 19, 1987, 3743290

Int. Cl.[4] F16D 65/02

U.S. Cl. 188—73.37 **16 Claims**



1. A brake arrangement for a disk brake of a vehicle comprising:

brake caliper means;

brake pad means guided in the brake caliper means on both sides of a brake disc;

a pair of hydraulically actuated actuating piston means operatively connected with the brake pad means, each actuating piston means of the pair having a bore in a piston end face facing an oppositely disposed brake pad surface of the brake pad means, each bore having both circumferential and bottom surfaces,

an insert element retained in each bore of the pair of actuating piston means with both radial and axial play with respect to the inner circumferential and bottom surfaces of an associated bore; and

a plate shaped intermediate means covering the piston end faces of the pair of actuating piston means and connecting each insert element.

4,886,148

SLIDING EXHAUST BRAKE HAVING MAIN VALVE AND AUXILIARY VALVE WITH FLOW SPACE THEREBETWEEN

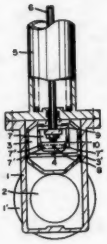
Ryoichi Suzuki, Mishima, Japan, assignor to Usui Kokusai Sangyo Kaisha Ltd., Nagasawa, Japan

Filed Nov. 10, 1988, Ser. No. 269,495

Claims priority, application Japan, Nov. 18, 1987, 62-176174

Int. Cl.[4] F02D 9/06

U.S. Cl. 188—273 **6 Claims**



1. A sliding exhaust brake comprising:

a housing having an exhaust passage extending therethrough and a reciprocating way communicating with the exhaust passage and angularly aligned thereto;

a cylinder assembly mounted in proximity to said housing, said cylinder assembly including a piston rod having an end disposed in said reciprocating way for alternate reciprocal movement toward and away from the exhaust passage;

a plate-like valve member mounted to said piston rod for limited relative movement thereto, said plate-like valve member being movably disposed in said reciprocating way from a first position for blocking said exhaust passage, to a second position for opening said exhaust passage, said plate-like valve member comprising a bottom wall extending generally transverse to the exhaust passage for substantially blocking the exhaust passage in the first position of said plate-like valve, a beam wall extending from said bottom wall and aligned generally transverse to the piston rod, a side wall extending from said bottom wall and disposed intermediate the end of the piston rod and the cylinder assembly, said bottom wall having an exhaust pressure regulating hole extending therethrough at a location thereon in proximity to said beam wall; and

an auxiliary valve member movably disposed in proximity to said bottom wall of said plate-like valve member and intermediate the beam wall and the side wall thereof, said auxiliary valve member comprising a main body portion securely mounted to said piston rod and a salient wall portion extending away from said main body portion and said piston rod and toward the beam wall of said plate-like valve member, such that said salient wall portion defines a flow space relative to said main body portion and said plate-like valve member, said salient wall portion being dimensioned to engage the beam wall in response to movement of the piston rod out of the cylinder assembly for urging the plate-like valve member into the first position and substantially blocking the exhaust pressure regulating hole, said salient wall portion being movable away from said beam wall in response to a movement of the piston rod into the cylinder assembly for opening the exhaust pressure regulating hole, whereby continued movement of the piston rod into the cylinder assembly urges said plate-like valve member into the second position.

4,886,149

ROTARY TYPE HYDRAULIC DAMPER

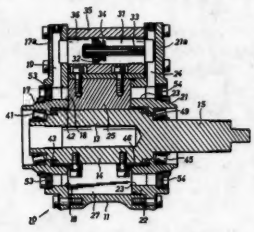
Kenji Uehara; Shinji Takayanagi, both of Tokyo, and Ikuo Oike, Saitama, all of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 3, 1987, Ser. No. 128,142

Claims priority, application Japan, Dec. 3, 1986, 61-288507; Dec. 3, 1986, 61-288511

Int. Cl.[4] F16F *9/14*

U.S. Cl. 188—306 **8 Claims**



1. A rotary-type hydraulic damper apparatus, comprising:

a housing; end cases closing the lateral ends of said housing;

one of said end cases containing fluid passage means defining the low pressure fluid passage of said apparatus and the other of said end cases containing fluid passage means defining the high pressure fluid passage of said apparatus;

a shaft enclosed within said housing and adapted for relative rotational movement therewith;

a plurality of vanes extending oppositely from said housing and said shaft defining alternately positioned fluid chambers, including expansion chambers and compression chambers about the interior of said housing; and

means for passing hydraulic fluid between said expansion chambers and said compression chambers in response to relative rotational movement between said shaft and said housing including means forming substantially unrestricted openings from one lateral end of said housing for communicating each of said expansion chambers with said low pressure passage in said one end case and means forming substantially unrestricted openings in the other lateral end of said housing for communicating each of said compression chambers with said high pressure fluid passage in said other end case.

4,886,150

BABY ACCESSORY CARRIER

Julie-Anna Fitzsimmons, Box 6028, Station A, Calgary, Alberta T2H 2L3, Canada

Filed May 23, 1988, Ser. No. 197,678

Int. Cl.[4] A45C *9/00*; A45F *4/06*

U.S. Cl. 190—1 **3 Claims**

1. A foldable carrying device comprising:

(a) an elongated uniformly rectangular body having an inside surface and an outside surface;

(b) said body comprising, a central uniformly rectangular panel integral with a pair of opposed uniformly rectangular side panels on either side of said central panel;

(c) said central panel and said side panels being substantially equal in rectangular dimension;

(d) said central panel on the inside surface thereof, having detachably secured thereto, a rectangular water impermeable change pad, being in configuration of slightly less dimension than said central panel;

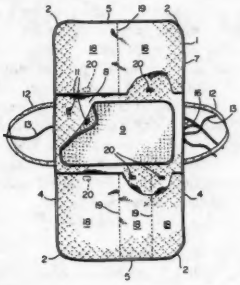
(e) each of said side panels, having permanently secured thereto on the inside of said body, rectangular pocket forming panel means, forming with a respective panel a pocket means, each substantially equal in dimension to its respective side panel;

(f) each of said pocket means having at least one opening facing toward said pad and including means for releaseably securing said pocket means in a closed condition;

(g) said central panel including opposed marginal edges;

(h) individual handle means extending outwardly from each of said marginal edges of said central panel;

(i) additional securing means extending outwardly from each of said marginal edges for securing said device together when folded for carrying;



(j) said body having, on the outside surface, at least one pocket on said central panel opening towards one of said marginal edges;

(k) said body having a longitudinal axis and being foldable along said longitudinal axis;

(l) said side panels being foldable over said central panel; and,

(m) said central and side panels being foldable together along said longitudinal axis.

4,886,151

GEARSHIFTING DEVICE FOR A MANUALLY OPERATED TRANSMISSION FOR MOTOR VEHICLES

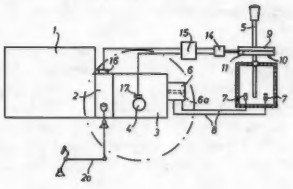
Erich R. Muller, Hohe Strasse 15, D-7110 Ohringen-Cappel, and Edmund Volkert, Steppachweg 77, D-7107 Neckarsulm, both of Fed. Rep. of Germany

Continuation-in-part of Ser. No. 907,725, Sep. 15, 1986, abandoned, which is a continuation-in-part of Ser. No. 740,074, May 13, 1985, abandoned. This application Mar. 18, 1988, Ser. No. 171,181

Claims priority, application Fed. Rep. of Germany, Sep. 14, 1983, 3333216

Int. Cl.[4] B60K *41/22*; F16H *5/42*

U.S. Cl. 192—3.62 **5 Claims**



1. A gear shifting device for a manually operated transmission for a motor vehicle having wheels driven through said transmission, said transmission having an input shaft connected through a disengageable clutch with a vehicle engine, an output shaft connected to the driven wheels and several gear steps between said input and output shafts; each gear step comprising two intermeshing gears, one of them being fast on an intermediate shaft driven by said input shaft and the other being loosely mounted on said output shaft, and means for engaging

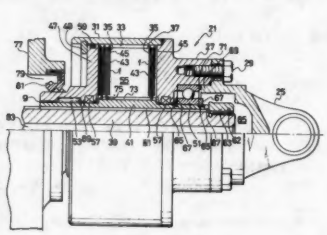
and disengaging said gear steps in communication with a gearshift lever which can be moved form a neutral position into a gear shifting position, the movement taking place in two steps—the first step being a preselection step for selecting a gear step and the second step acting to engage the selected gear step; a number of contacts, one for each gear step, to be engaged by the gearshift lever at the end of the second step according to the selected gear step; a locking device which permits movement of the gearshift lever from the first into the second step only when the clutch is disengaged; first sensing means for sensing the speed of each gear on the output shaft and second sensing means for sensing the speed of the output shaft; means for comparing the speeds of the gear selected and the output shaft; means for generating a first output signal if the speeds sensed are synchronized; a third sensing means generating a second output signal when the clutch is disengaged; and means for releasing said locking device upon receipt of said second output signal so that the gearshift lever can be moved from the first into the second step to activate the means for engaging and disengaging gear steps for the selected gear step upon generation of said first output signals.

4,886,152

POWER TRANSMISSION UNIT

Masao Teraoka, Omiyamachi, Japan, assignor to Tochigifujisangyo Kabushiki Kaisha, Tochigi, Japan

Continuation-in-part of Ser. No. 24,617, Mar. 11, 1987, abandoned. This application Sep. 13, 1988, Ser. No. 244,054
Claims priority, application Japan, Mar. 14, 1986, 61-36236
Int. Cl.[4] F16D *35/00*
U.S. Cl. 192—58 B **3 Claims**



1. A power transmission apparatus comprising:

first rotary shaft means protruding from within a gear box;

second rotary shaft means coaxially disposed with the first rotary shaft means, said first and second rotary shaft means being rotatable with respect to each other;

a plurality of resistance plates alternately fixed with respect to the first and second rotary shaft means in the rotational direction;

means defining a working chamber hermetically enclosing the plurality of the resistance plates and filled with a viscous fluid, said working chamber being disposed outside the gear box, said plurality of the resistance plates being operative to transmit power between the first and second rotary shaft means by the viscous resistance of the viscous fluid contained in said working chamber;

a seal member disposed between the gear box and the outside of the second rotary shaft means and sealing a clearance formed therebetween; and

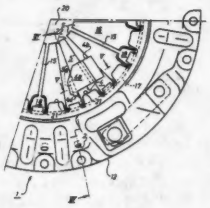
emitting means for externally emitting heat generated between the resistance plates and the viscous fluid through a flow of liquid lubricant, said emitting means having a first passage for said lubricant axially extending through the first rotary shaft means, a second passage for said lubricant axially disposed between the first rotary shaft means and a sleeve spline-engaged with the first rotary shaft means, and connecting means for interconnecting said first and second passages in a manner permitting said liquid lubricant to circulate therethrough.

4,886,153

COOLING MECHANISM OF A CLUTCH COVER ASSEMBLY

Mitsuhiko Takenaka, and Mitsuo Higashiji, both of Neyagawa, Japan, assignors to Kabushiki Kaisha Daikin Seisakusho, Osaka, Japan

PCT No. PCT/JP87/00744, § 371 Date Apr. 6, 1988, § 102(e) Date Apr. 6, 1988, PCT Pub. No. WO88/02826, PCT Pub. Date Apr. 21, 1988
PCT Filed Oct. 5, 1987, Ser. No. 199,411
Claims priority, application Japan, Oct. 16, 1986, 61-158761
Int. Cl.[4] F16D *13/72*
U.S. Cl. 192—113 A **4 Claims**



1. A cooling mechanism in a clutch cover assembly including a clutch cover body of dish-like shape provided with a central aperture of a large diameter and a diaphragm spring having a radially outer annular spring portion pinched by a pair of wire rings to the clutch cover body, said diaphragm spring including a plurality of radial tongues which extend radially inwardly from said annular spring portion to the inner periphery of said annular spring portion with slits having enlarged openings at the radial outer end therebetween, characterized by that some of said tongues, spaced circumferentially from each other, are recessed at an edge of the tongue at the slit between said tongue and the adjacent tongue, except for the portion of said edge adjacent to said opening, to reduce the width thereof, and a vane member having a vane support formed integrally with said vane mounted on each of said circumferentially spaced tongues with said vane support in the recess at the tongue edge and fixing said vane member to said tongues, said vane member having a vane projecting out from said support and the slit between the recessed vane and the contiguous adjacent vane for feeding air into said slit and ventilation ports connecting to an internal space in said clutch cover assembly at radially outer portions of said clutch cover body for discharging air fed into said clutch cover through said slits by said vane projections.

4,886,154

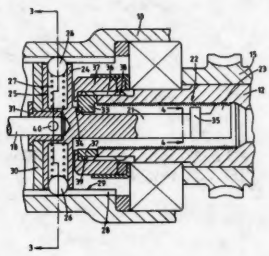
COUPLING FOR A LINEAR DISPLACEMENT TRANSDUCER

Stephen H. Davies, Telford, United Kingdom, assignor to Lucas Industries, public limited company, United Kingdom

Filed Aug. 11, 1988, Ser. No. 231,106
Claims priority, application United Kingdom, Aug. 14, 1987, 8719298
Int. Cl.[4] F16D *71/00*; F16H *25/24*
U.S. Cl. 192—141 **7 Claims**

1. A device for coupling a rotatable member to a linear variable displacement transducer which has a linearly movable input stem, comprising a housing, an element, axially movable in said housing and adapted for coupling to said input stem, said element having a threaded portion engaging a complementary threaded portion on said member, a spring-biassed detent means for restraining said element against rotation, and

abutments on said element and said member, said abutments being interengageable at one limiting extent of linear travel of said element relative to said member, to cause said element to



overcome said detent means and to rotate with said member in a first direction only, whereby beyond said one limiting extent of linear travel the input to said transducer remains unaltered.

4,886,155

90 DEGREES TURNING DEVICE WITH MEANS FOR CONSTANT ANGULAR VELOCITY

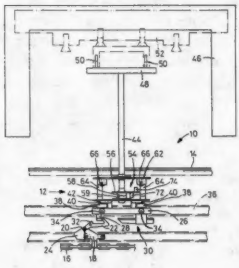
Keiji Toyonaga, Okazaki, and Ichiro Ueno, Kashihara, both of Japan, assignors to Toyota Jidosha Kabushiki Kaisha and Tsubakimoto Chain Co., both of, Japan

Filed Aug. 9, 1988, Ser. No. 230,087

Claims priority, application Japan, Aug. 11, 1987, 62-123020[U]

Int. Cl.[4] B65G *47/24*

U.S. Cl. 198—377 **13 Claims**



1. A 90° turning device including a moving member which is moved along a linear path, and a turning member which is pivoted through an angle of 90 degrees about an axis of rotation perpendicular to said linear path, as said moving member is moved along said linear path, said turning device comprising:

a first cam follower provided on one of opposite surfaces of said turning member;

a second cam follower provided on the other of said opposite surfaces of said turning member;

a first cam having a first straight cam surface which is inclined with respect to said linear path and which is engageable with said first cam follower;

a second cam spaced apart from said first cam in a direction parallel to said axis of rotation of said turning member, said second cam having a second straight cam surface which is engageable with said second cam follower, said second straight cam surface being inclined with respect to said linear path, such that said second cam follower is moved perpendicularly to said linear path in the same direction as said first cam follower as said moving member is moved along said linear path;

said first and second cams being positioned such that an engaging action between said second cam follower and said second straight cam surface is initiated when an engaging action between said first cam follower and said first straight cam surface is terminated, one of said axis of rotation of said turning member and said first and second cam followers leading the other of said axis of rotation and said cam followers, while said moving member is moved along said linear path.

4,886,156

LOG CONVEYOR SYSTEM

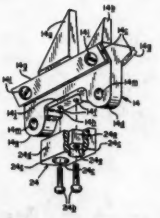
Robert A. Records, Newberg; Ralph E. Luchterhand, Portland, and John F. Detroit, Newberg, all of Oreg., assignors to U.S. Natural Resources, Log Boss Systems Division, Portland, Oreg.

Continuation of Ser. No. 725,303, Apr. 19, 1985, abandoned.

This application Jan. 19, 1988, Ser. No. 144,757

Int. Cl.[4] B65G *15/44*

U.S. Cl. 198—692 **16 Claims**



1. A log-transporting conveyor chain for use within a chain raceway having an upwardly facing surface for providing vertical support to said chain, and a lower portion for providing lateral support and alignment to said chain, comprising:

a log-transporting link having an upper portion with vertical load support means for conveying vertical load to the upwardly-facing surface of the raceway, and a downwardly extending portion which extends into the lower portion of the raceway, wherein said link includes first lug means and second lug means disposed within the lower portion of the raceway;

interconnecting links forming a chain disposed about a path of conveyance including a first pair of opposed tie strap links connecting to said first lug means and a second pair of opposed tie strap links connecting to said second lug means for travel within the lower portion of the raceway; and

a guide block secured to said log-transporting link intermediate said first lug means and said second lug means, said guide block having opposing guide surfaces disposed transversely with respect to the path of conveyance and transversely spaced apart a greater distance than the width of said interconnecting links for aligning said chain as it travels through the raceway.

4,886,157

WORKPIECE DELIVERY MAGAZINE

Robert M. Sunnen; Frank E. Vanderwal, both of Frontenac, and Richard S. Jackson, Crestwood, all of Mo., assignors to Sunnen Products Company, St. Louis, Mo.

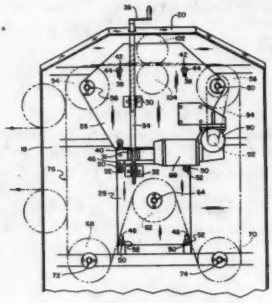
Filed Sep. 21, 1987, Ser. No. 98,549

Int. Cl.[4] B23Q *7/04*

U.S. Cl. 198—839 **18 Claims**

14. A mechanism for supporting a plurality of workpieces for feeding single file into position to be fed to a machine tool

having a working member rotatable about an axis of rotation comprising a pair of spaced endless chains each formed by a plurality of hingedly connected links and means connecting corresponding links of the chains by means for supporting a workpiece by engagement with an internal surface thereon to be machined, means supporting the spaced chains in a plane acutely angularly oriented relative to vertical and to the axis of



the working member, each of said chains having a corresponding reach that extends at a location adjacent to the axis of rotation of the working member, means engagable with said corresponding reaches to orient the chains in said corresponding reaches so that the means supporting a workpiece thereat orients the axis of a workpiece surface being supported into a position substantially in alignment with the axis of the working member.

4,886,158

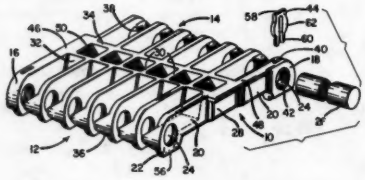
MODULAR CENTER DRIVE CONVEYOR BELT

James M. Lapeyre, New Orleans, La., assignor to The Laitram Corporation, New Orleans, La.

Continuation of Ser. No. 844,537, Mar. 26, 1986, abandoned, which is a continuation of Ser. No. 179,523, Aug. 19, 1980, abandoned. This application Nov. 23, 1988, Ser. No. 275,682

Int. Cl.[4] B65G *17/06*

U.S. Cl. 198—853 **10 Claims**



1. A conveyor belt comprised of a plurality of modules linked by pivot rods and driven in a selected direction of travel by sprocket teeth of a sprocket wheel, each module comprising:

first and second pluralities of link ends at least some of said first and second pluralities being formed to circumscribe a pivot hole;

said first and second pluralities each having outer link ends on opposing sides of the module and at least one link end intermediate said outer links, said link ends being spaced apart such that the module is suitable for bricklaying in said belt;

an intermediate section between and joining said link ends and having transverse elements extending at least partially across the width of the module;

at least two of said transverse elements at various positions across the width of the module having a driving-; surface capable of engagement by said sprocket teeth, said driving surfaces having an upper edge and a lower edge and being angled from said upper edge downward toward said lower edge and in said selected direction of travel to provided sprocket recesses intermediate the pivot axes of the module and adapted to mate with sprocket teeth of said sprocket wheel.

4,886,159

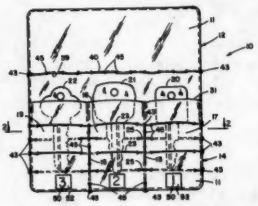
MULTIKEY CARRIER

Clarence E. Grandy, 75 Oaklawn Ave., Stamford, Conn. 06905

Filed Jul. 28, 1988, Ser. No. 225,226

Int. Cl.[4] A45C *11/00, 11/32*

U.S. Cl. 206—37.4 **5 Claims**



1. A key case for holding a plurality of keys in an unattached side-by-side flat orientation in said case comprising:

a foldable flat cover,

a plurality of foldable transparent flaps having open therein, said flaps being foldable with said cover,

divider means for dividing said pockets into a plurality of separated open top key compartments which are adaptable to receive and hold keys therein in a flat, unattached configuration with the keys being inserted and removed through the open top of said compartments, and

a plurality of horizontally extending means alternatively woven on opposite sides of said separated compartments to provide support and stability of keys housed therein.

4,886,160

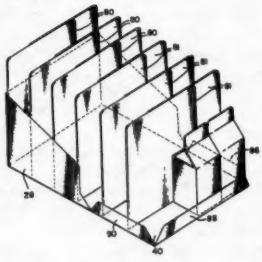
CARTON FOR CONTAINING A PLURALITY OF ITEMS FOR TRANSPORT, STORAGE AND DISPLAY

Alan E. Kligerman, c/o Lactaid Inc., Fire Rd. & Lister La. P.O. Box 11, Pleasantville, N.J. 08232

Filed Nov. 7, 1988, Ser. No. 267,668

Int. Cl.[4] B65D *5/54*

U.S. Cl. 206—44 R **10 Claims**



1. A unitary blank for forming a carton for containing a plurality of discrete items for transport, storage and display of the items, the blank when assembled having a cover portion detachable from a display portion, said blank comprising:

a back wall panel having a top edge, a bottom edge, a pair of

side edges, and a perforation extending between said pair of side edges;

a lid including a front edge and a back edge hingedly connected to said back wall panel top edge;

a first bottom tab hingedly connected to said bottom edge of said back wall panel;

a first side panel having a front edge, a top edge, a bottom edge and a rear edge hingedly connected to one of said pair of side edges of said back wall panel, said first side panel including a perforation extending between said front edge and said rear edge thereof and being interconnected to said back wall panel perforation;

a second bottom tab hingedly connected to said bottom edge of said first side panel;

a front wall panel having a top edge, a bottom edge, a first side edge and a second side edge hingedly connected to said front edge of said first side panel, said front wall panel including a perforation extending between said first side edge and said second edge thereof and being interconnected to said first side panel perforation;

a third bottom tab hingedly connected to said bottom edge of said front wall panel;

a second side panel having a top edge, a bottom edge, a rear edge and a front edge hingedly connected to said first side edge of said front wall panel, said second side panel including a perforation extending between said rear edge and said front edge thereof and being interconnected with said front wall panel perforation, said perforation of said second side panel includes a second perforation extending therefrom to the intersection of said second side panel bottom and front edges and said bottom edge of said front panel;

a fourth bottom tab hingedly connected to said bottom edge of said second side panel; and

a securing flap hingedly connected to either said back wall panel or said second side panel and including a perforation.

4,886,161

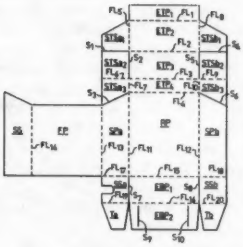
CONTAINER FOR CIGARETTES, AND CARDBOARD BLANK FOR USE IN MAKING SAME

Itzhak Keidar, 19 Chisin St.; Asher Dromi, 11 Shderot Yotzer, both of Tel Aviv; Menahem Tilman, 34 Shaldag St., Hofit, and Joseph Harel, 38 Hagefen St., Ramat Hasharon, all of Israel

Filed Jan. 25, 1989, Ser. No. 301,093

Int. Cl.[4] B65D *85/10*

U.S. Cl. 206—246 **17 Claims**



1. A container for containing a plurality of cigarettes, comprising: a front wall panel, a rear wall panel, two side wall panels, and two end walls; characterized in that one of said end walls is constituted of a pair of end wall panels slitted and formed with fold lines such that said end wall panels are normally folded against each other to a closed condition to form the respective container end wall, but may be unfolded to an open condition and retained in said open condition to form an extension of said container to serve as an ashtray.

4,886,162

CONTAINER FOR VACUUM STORING AND/OR SHIPPING SILICON WAFERS

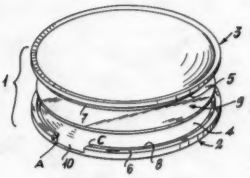
Sala Ambrogio, Agrate Brianza, Italy, assignor to SGS-Thomson Microelectronics S.p.A., Cantania, Italy

Filed Feb. 2, 1988, Ser. No. 151,454

Claims priority, application Italy, Feb. 6, 1987, 20755/87[U]

Int. Cl.[4] B65D *73/02*

U.S. Cl. 206—328 **5 Claims**



1. A container designed for vacuum holding and transporting a silicon wafer, the container comprising:

an upper circular portion having an outwardly bulged upper face, the upper circular portion having an outer raised edge near the periphery thereof,

a lower circular portion having a circumference which is substantially the same as that of the other circular portion, the lower circular portion having an outwardly bulged lower face, the lower circular portion further comprising an outer raised edge near the periphery thereof and an inner raised edge of lesser height than the outer raised edge, and an opening comprising a break in the inner and outer raised edges of the lower circular portion,

the upper and lower circular portions being adapted to form the closed container with the outer raised edge of the upper circular portion being substantially radially adjacent the inner raised edge of the lower circular portion, the edge of the wafer being located in use between said outer and inner raised edge of the upper and lower circular portion respectively.

4,886,163

ELECTROSTATIC DISSIPATIVE MAINTENANCE AID MODULE CONTAINER

Nelson M. Hubbell, Niantic; Susan L. Murdock, Ledyard, and Ernest P. Romano, Groton, all of Conn., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Apr. 21, 1989, Ser. No. 341,600

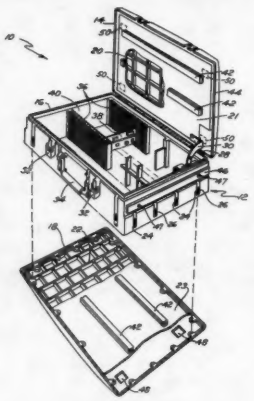
Int. Cl.[4] B65D *73/02*

U.S. Cl. 206—334 **7 Claims**

1. An electrostatic dissipative maintenance aid module container comprising:

an electrostatic dissipative housing in suitcase form including an electrostatic dissipative lid, an electrostatic dissipa-

tive middle section, and an electrostatic dissipative bottom section; and



said lid and said bottom section having inner molding ribbing patterns.

4,886,164

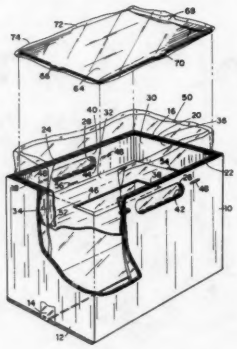
CONTAINERS FOR MEDICAL WASTE

Israel M. Stein, Chestnut Hill; Alan S. Goodman, Roxbury, and Richard Romanow, South Boston, all of Mass., assignors to Enviro Med, Inc., Boston, Mass.

Filed Jun. 16, 1989, Ser. No. 367,173

Int. Cl.[4] B65D *5/12, 81/00*

U.S. Cl. 206—366 **22 Claims**



1. A container for medical waste which comprises a box having a closed bottom and side walls extending upwardly to an open top, an insert having a bottom with side walls complimentary in shape to the side walls of said box in the region of said box which is adjacent to the top thereof, said insert being disposed within said box at the top thereof with said bottom of said insert spaced from said top, said bottom of said insert having a mouth for receiving items of medical waste, said side walls of said insert having a plurality of notches therein in spaced relationship with each other and disposed along said bottom of said insert where said side walls of said insert meets that bottom of said insert, and a cover panel having edges, tabs extending from said edges and disposed in the same spaced relationship as said notches, said cover panel being disposed on said bottom of said insert closing and locking said mouth with said tabs in said notches in order to close and lock said container.

4,886,165

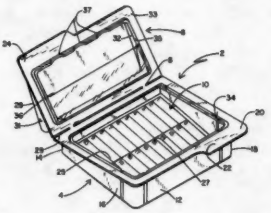
HINGED CONTAINER FOR SURGICAL ARTICLES

Leland W. Annett, Lake Elmo, Minn., assignor to Medical Concepts Development, Inc., St. Paul, Minn.

Filed Feb. 7, 1989, Ser. No. 307,042

Int. Cl.[4] B65D *1/34, 1/40, 25/14*

U.S. Cl. 206—370 **9 Claims**



1. A hinged container for surgical articles comprising:

a container bottom and container cover joined along a common severable hinge;

the container bottom having a generally rectangular floor member in a first plane, a first pair of opposing sides extending upwardly from the floor member such that one of said first pair of opposing sides is slightly taller than the other, a second pair of mirror image opposing sides extending upwardly from the floor member, all of the four sides terminating at a planar rim extending outwardly from the sides, the planar rim being in a second plane at an oblique angle to the first plane of the floor member, one of said first pair of opposing sides joined to the common severable hinge, a female trough inside the rim substantially surrounding the sides, and an unlatching means on the rim on the side opposite the hinge;

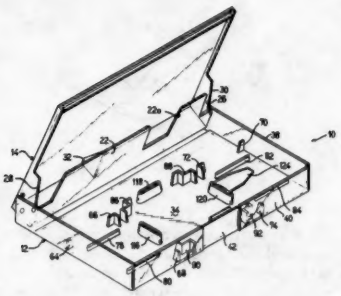
the container cover including a generally rectangular top member in a third plane, a first pair of opposing sides extending downwardly from the top member such that one of said first pair of opposing sides is slightly taller than the other, a second pair of mirror image opposing sides extending downwardly from the top member, all four of the sides terminating at a planar rim extending outwardly from the sides, the planar rim of the cover being in a fourth plane at an oblique angle to the third plane of the top member, one of said first pair of opposing sides joined to the common severable hinge, a male trough inside the rim substantially surrounding the sides in cooperating alignment with the female trough on the container bottom, an unlatching means on the rim on the side opposite the hinge in cooperating alignment with the unlatching means on the container bottom, a pocket forming guard means inside the rim along the slighter taller side, forming a pocket with the top member and the mirror image sides over at least a portion of the cover; and

accounting means located generally on the floor member for facilitating accounting of the surgical articles.

4,886,166
EASEL CASE FOR SOFTWARE HAVING ANTI-PILFERAGE MEANS

Jack D. Bankier, 1724 Long Valley Dr., Northbrook, Ill. 60062, and Marshall Weinstein, 1900 Clendinen La., Riverwoods, Ill. 60015

Continuation of Ser. No. 608,367, May 9, 1984, abandoned. This application Oct. 4, 1985, Ser. No. 785,093
Int. Cl.[4] B65D *85/672, 85/30*
U.S. Cl. 206—387 **37 Claims**



1. A software comprising:
a first section including a bottom wall and a plurality of sidewalls extending from said bottom wall and therewith defining a chamber;
a second section pivotally connected to said first section as a cover therefor;
locating means mounted in the chamber and defining at least one storage position for at least one software cartridge; and
frangible single use anti-pilferage means engaging said locating means and locking said at least one software cartridge, whereby breakage of said anti-pilferage means prevents relocking of the said at least one cartridge.

7. A software case comprising:
a bottom including a bottom wall having an edge, sidewalls extending from said bottom wall and having edges, a pair of sidewall sections extending beyond said edge;
said bottom further including locating means for receiving and locating at least one first software element and including a slot, and frangible means including a first member for non-releasable engagement in said slot and a second member for holding the software element against said bottom; and
a cover rotatably connected to said sidewall sections and rotatable between a first position at which said case is closed and a second position greater than 270° from said first position at which said cover engages said edge of said bottom wall and said case may rest on said edges of said sidewalls to serve as an easel,
said cover comprising pocket means defining a plurality of pockets of predetermined different sizes for receiving materials of corresponding different sizes, said pocket means comprising three walls including a first wall, a second wall parallel to said first wall, and a third wall connecting said first and second walls in a trough structure and a divider projecting from one of said three walls,
whereby documentation may be positioned on said first wall and said sidewall sections and maintained in such position by said second wall.

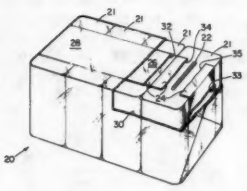
17. A software case comprising:
a cover including first means for storing a magnetic disk and second means for storing documentation;
a base pivotally connected to said cover and including a closed side, an open side and third means for storing a plurality of cartridges of different predetermined sizes and shapes;
single use frangible anti-pilferage locking means for engaging said base and locking the plurality of cartridges thereto to prevent pilferage; and
a rotatable connection of said cover to said bottom providing said pivotal connection for rotation of said cover from a closed position at which said cover engages said open side to a position at which said cover engages said closed side and at which said open side serves as a stand and the cover serves as an easel.

18. A software case comprising:
a base including first means for receiving and locating at least one first software element;
single use frangible anti-pilferage locking means for locking the first software element to said base to prevent pilferage thereof; and
a cover pivotally connected to said base and including second means for receiving and locating at least one second software element.

4,886,167
COMPACT, CORE-WOUND PAPER PRODUCT

Donald D. Dearwester, Hamilton, Ohio, assignor to The Procter & Gamble Company, Cincinnati, Ohio

Filed Apr. 14, 1989, Ser. No. 338,782
Int. Cl.[4] B65D *85/67*
U.S. Cl. 206—389 **13 Claims**



1. A paper product comprising a unidirectionally compression loaded, core-wound roll of paper and compression constraining means, said roll of paper comprising a core and a length of paper wound thereon, said core being substantially flat and said product having a somewhat obround shape, said product being susceptible to being shaped by a user so that said product has a generally round cross section and so that said core has an open tubular shape.

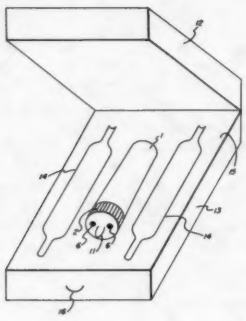
4,886,168
DEVICE DESIGNED TO PRESERVE COSMETIC SUBSTANCES THAT CAN BE FROZEN

Raymond Bontemps, 5 Avenue de la Grande Armée, 75008 Paris, France

Filed Sep. 26, 1988, Ser. No. 248,977
Claims priority, application France, Sep. 30, 1988, 87 13504
Int. Cl.[4] B65D *69/00*
U.S. Cl. 206—568 **10 Claims**

1. A device for storing a freezable substance of fetal or cosmetic origin at ambient temperature, comprising:
an isothermic case for containing a dehydrated fetal or cosmetic substance, said case having a generally cylindrical wall, a closed end and an open end;
a cover for closing and reopening the case, said cover including a base portion and an annular portion extending from the base portion, said annular portion sized and shaped to fit in a sealing engagement with a portion of the

generally cylindrical wall defining the open end of said case; and



means for communicating a rehydrating substance from an external source to within the closed case.

4,886,169

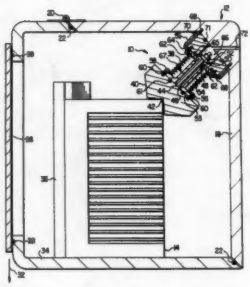
BELLOWS CLAMP ACTUATOR

Joe W. Ayers, Sherman, and William D. Autery, Richardson, both of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Continuation of Ser. No. 108,200, Oct. 13, 1987, abandoned. This application Feb. 14, 1989, Ser. No. 309,895

Int. Cl.[4] B25B *11/00;* **A45D** *42/14;* **F16B** *47/00;* **A47H** *33/00*

U.S. Cl. 206—591 **27 Claims**



1. Apparatus for accurately securing a work station within an enclosed container, comprising:

said enclosed container;

said work station disposed within said enclosed container;

an extendible member having substantially opposing end portions, one said end portion of said extendible member for contacting and securing said work station and a second end portion of said extendible member attached to the interior of said container; and

means responsive to a predetermined pressure difference between the interior and the exterior of said enclosed container for extending said extendible member to cause said extendible member to engage the work station with sufficient force to compensate for any deformation of the work station to maintain the work station in the desired precise position.

4,886,170

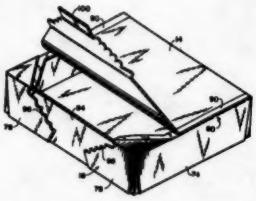
MICROWAVE CARTON

Monroe J. Willey, East Brunswick, and Daniel D. Evert, Englishtown, both of N.J., assignors to General Foods Corporation, White Plains, N.Y.

Filed Apr. 28, 1988, Ser. No. 192,261

Int. Cl.[4] B65D *17/28*

U.S. Cl. 206—609 **6 Claims**



1. A microwave carton which is constructed from a unitary carton blank; said carton comprising:

a carton bottom structure including a substantially rectangular bottom panel; side panels extending from the periphery of said bottom panel and web corners extending between the side panels, crease lines formed along the periphery of said bottom panel, at the intersection of the web corners with the side panels to enable folding of the side panels normally of the bottom panel so as to provide a liquid containing carton bottom structure;

a substantially rectangular carton top structure including a top Panel integrally connected with and extending from one outer edge of one of said side panels and being dimensioned to overlie the bottom structure;

a front flap extending from a second edge of said top panel opposite said one edge;

side flaps extending from the adjoining edges of said top structure intermediate said above-mentioned edges;

tearable joints extending across said top panel along crease lines forming the adjoining edges of the side flaps and the top structure intermediate the edges, said tearing joints including upper and lower score lines with the upper score lines extending along the adjoining edges in a non-continuous fashion and generally parallel with the lower score lines, said lower score lines being continuous and offset from said upper score lines to provide a tearing distance therebetween over a portion of said top panel and then converging towards said second edge wherein the upper and lower score lines are continuous to define a top flap overlying a substantial portion of the bottom-structure; and

a front flap integral with and hinged to the second edge of said top panel; and a lifting tab being formed centrally at the free edge of said front flap; and foraminations in said front flap extending between said lifting tab and said tearable joints in said top panel.

4,886,171

DISPLAY STAND CONVERTIBLE TO GRAVITY FEED

William S. Spamer, Roswell, Ga., assignor to The Mead Corporation, Dayton, Ohio

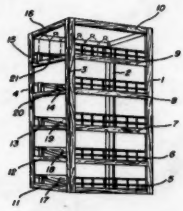
Filed Mar. 20, 1989, Ser. No. 325,905

Int. Cl.[4] A47F *1/00, 7/28*

U.S. Cl. 211—59.2 **13 Claims**

1. A display stand having four corner posts, horizontal front, rear and a pair of side support rails disposed in a common plane and interconnected at their ends to said corner posts and forming a pattern of quadrilateral configuration having right angle corners, a complementary shelf of quadrilateral configuration having right angle corners removably supported by said front and side support rails, wherein the improvement comprises a

pair of support brackets mounted on said side support rails respectively and adjacent the rear ends thereof and projecting upwardly therefrom, and an elongated support element arranged to extend between said support brackets and whose ends are removably mounted respectively on said support



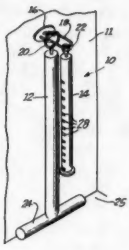
brackets at a level above said rear support rail so that the rear edge of said shelf is disposed above the level of said rear support rail when mounted with its rear portion disposed atop said elongated support element and arranged with its front edge in engagement with and supported by said front rail.

4,886,172

CLOTHES HANGING STAND

Donald R. Kummerlen, 4241 NE. 26th Ter., Lighthouse Point, Fla. 33064

Filed Jul. 25, 1988, Ser. No. 223,921
Int. Cl.[4] A47F *5/08*
U.S. Cl. 211—87 **13 Claims**



1. Hanging apparatus of a type extendable from a wall when in use and resting against said wall when not used comprising:

a leg and an arm;

a first securing member secured against said wall;

a second securing member affixed between one end of said arm and said first securing member for pivotally securing said arm to said first securing member; and

a third securing member affixed to said leg and movable around said first securing member, said second securing member and said arm from a nonuse position between said second securing member and said wall to a use position around said arm remote from the one end so as to support said arm in a generally horizontal position.

4,886,173

COIL FOR STORING USED PLASATIC GROCERY BAGS

Victor H. Goulter, 485 Molimo Dr., San Francisco, Calif. 94127

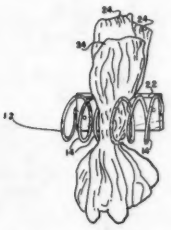
Filed Jan. 27, 1989, Ser. No. 302,378
Int. Cl.[4] A47F *5/08*
U.S. Cl. 211—89 **7 Claims**

1. A device for storing used plastic grocery bags, comprising:

an elongated elastic wire member having a helical shape so as to form a helix, said helix having adjacent turns which are spaced apart, thereby to form an open helix, said helix having an imaginary axis extending therethrough,

said wire member having two free end portions at the respective ends of said helix, said end portions making a substantially right-angle bend with the respective adjacent portions of said helix, each end portion extending parallel to said axis and outside said helix, each end portion pointing to the opposite end portion,

means for mounting said helix by said two free end portions such that any adjacent pair of turns of said helix can be compressed or expanded and said helix can rotate to a limited extent, said means comprising a rigid base with two major surfaces which are flat and parallel to each other and at least two end surfaces interconnecting said major surfaces, said end surfaces being parallel to each other and perpendicular to said major surfaces, each of



said end surfaces having a hole therein, said free end portions of said wire member being inserted into said respective holes in said end surfaces, such that said helix is positioned adjacent one of said major surfaces, and such that said axis of said helix is parallel to said major surfaces,

said wire member being free of any connection to said base other than by said end portions, such that any adjacent turns of said helix can be compressed or expanded, and such that said helix can rotate to a limited extent on said base,

said helix being under tension so that it urges said free end portions together so as to compress said base between said ends thereof,

whereby said device can be used to store a plurality of used plastic grocery bags in a rapid, convenient, and economical manner with one hand, and whereby any bag can be removed from storage for later re-use in an equally rapid and convenient manner with one hand.

4,886,174

LOAD COMPENSATING DEVICE FOR A HANDLING MACHINE AND PROCESS FOR CARRYING OUT SUCH COMPENSATION

Jean Leveugle, Lyon, France, assignor to Reel S A, Caluire, France

Filed May 16, 1988, Ser. No. 194,178
Claims priority, application France, May 20, 1987, 87 07277
Int. Cl.[4] B66C *19/00*
U.S. Cl. 212—149 **18 Claims**

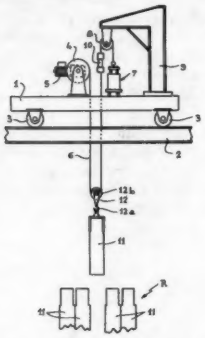
1. A load compensating device of the type comprising a detector adapted to stop displacement of a cable to which the load is attached in the event the load encounters an obstacle and the reaction of the load developes forces on the cable varying above or below a threshold, wherein the device comprises:

a fixed armature having upper and lower end stops;

a sliding block adapted to slide in said armature between said end stops;

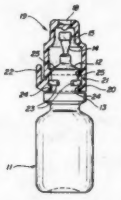
an outer bell element provided with engaging means adapted to cooperate with said sliding block;

an overload jack disposed between said sliding block and said armature;
an underload jack housed between said sliding block and said outer bell element;
a pressure supply communicating with each of said overload jack and said underload jack;



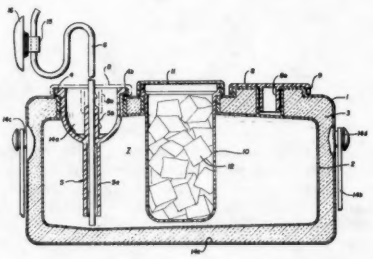
a counterweight to which the cable for handling the load is attached, said counterweight being axially moveable between two limits with respect to said outer bell element;
and control means for modulating said pressure supply to said overload and said underload jacks as a function of the variations in the load forces on the cable.

4,886,175
BOTTLE AND CAP CLOSURE SYSTEM
Thomas E. Schlaudecker, Hamilton Square, N.J., assignor to Merck & Co., Inc., Rahway, N.J.
Filed Apr. 10, 1989, Ser. No. 335,358
Int. Cl.[4] B65D *41/34*
U.S. Cl. 215—32 **8 Claims**



6. A bottle and cap closure system comprising:
(a) a bottle body having a lower portion and an upper portion, said upper portion being in the form of an upwardly extending tapered neck having an elongated tip extending upwardly from said tapered neck and a break off tab seal at the upper end of said elongated tip;
(b) a plurality of circumferentially spaced, outwardly protruding lugs or cams intermediate the length of said tapered neck;
(c) a cap having a closed upper end and an open lower end;
(d) a circumferential tear away band at the open, lower end of said cap, said tear away band carrying an outwardly protruding pull tab integrally formed therewith to facilitate removal of said tear away band from said cap and an integrally formed, circumferential, inwardly protruding bead at the open, lower edge of said tear away band; and,
(e) a plurality of circumferentially spaced, inwardly protruding lugs or cams intermediate the upper end of said tear away band and the top of said cap
such that when said cap is placed upon said bottle, said bead engages said outwardly protruding lugs or cams on said tapered neck to secure said cap to said bottle and when said tear away band is removed from said cap, said inwardly protruding lugs or cams in said cap engage said outwardly protruding lugs or cams on said tapered neck to secure said cap to said bottle.

4,886,176
PORTABLE LIQUID COOLER
Betty P. Steakley, 6289 Plumosa Ave., Fort Myers, Fla. 33908
Filed Oct. 25, 1988, Ser. No. 261,986
Int. Cl.[4] A45F *5/02*; B65D *51/24, 47/06*
U.S. Cl. 215—229 **7 Claims**

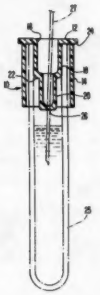


1. A portable liquid cooler comprising, a container having top, bottom and side walls, a drinking liquid in said container, a plug removably mounted on the top wall of said container, a recess provided in said plug, an integral tube connected to said plug, said tube having a depending portion extending from the bottom wall of said recess into said container and a portion extending upwardly from the bottom wall of said recess, a flexible plastic tubing insertable through said integral tube to thereby provide a removable straw for drawing the liquid from the container, the relative diameters of the upwardly extending tube portion and the tubing providing a snug fit therebetween to thereby prevent liquid from splashing out of the container, a closure removably mounted on said plug for closing the integral tube when the flexible tubing has been removed therefrom, said closure having a depending tubular portion adapted to extend over the upwardly extending portion of the integral tube, a receptacle containing a coolant removably mounted on the top wall of said container, said receptacle extending through an opening in said top wall and depending therefrom into the liquid within the container, the bottom wall of said container being sloped in a direction toward the tubing, whereby the liquid in the container will remain in the vicinity of the lower end of the tubing even when the contents of the container are low and the top wall of the container being sloped in a direction toward said opening so that after washing the cooler can be placed in an upside-down manner to thereby drain the wash water therefrom.

4,886,177
CAP FOR TUBES
Kevin D. Foster, Atlanta, Ga., assignor to Porex Technologies Corp. of Georgia, Fairburn, Ga.
Filed Oct. 31, 1988, Ser. No. 264,898
Int. Cl.[4] B65D *41/20*
U.S. Cl. 215—247 **12 Claims**

1. A cap for sealing tubes of various sizes and permitting the withdrawal of fluids therefrom, comprising:
a top wall having an opening therein;
a plurality of bands projecting serially from the top wall; and
a skirt depending from the top wall and surrounding the bands,
wherein the bands include a first band adjacent to said top wall and having a first outer perimeter, and a second band depending from said first band and having a second outer

perimeter smaller than first outer perimeter, and a transverse wall extending across said second band, said transverse wall being made of an elastic material defining means for resealing itself in response to puncturing by and removal of a needle.



4,886,178

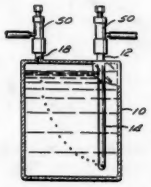
METHOD AND APPARATUS FOR PACKAGING, SHIPPING AND USING POISONOUS LIQUIDS

Hans-Juergen Graf, Oceanside, Calif., assignor to Air Products and Chemicals, Inc., Allentown, Pa.

Continuation of Ser. No. 188,089, Apr. 27, 1988, abandoned, which is a continuation of Ser. No. 944,189, Dec. 22, 1986, abandoned. This application Oct. 19, 1988, Ser. No. 259,934

Int. Cl.[4] B67B *5/00, 7/24*

U.S. Cl. 215—247 **11 Claims**



1. A bubbler container for containing and transporting ultrapure corrosive and poisonous liquid reagents which must be protected from exposure to air and from transmission of gas or vapor through containment walls, comprising in combination: a vessel formed of a material which is inert to the poisonous liquid reagent, and which is a barrier to gas transmission, for containing the liquid; a conduit forming at one end an opening into the vessel, the other end extending to a point proximate the bottom of the vessel; an outlet conduit for permitting outflow of the poisonous reagent; a first layer sealed in a gas-tight relation to a conduit into the vessel closing the conduit opening, the first layer being composed of material which is chemically inert to the liquid to be shipped, stored and used in the container and being thin and capable of being penetrated by a sharp hollow needle; a second overlaying the first layer, the second layer composed of resilient material so composed and configured as, in use, to be readily capable of being penetrated by a sharp hollow needle and gripping said needle in fluid tight seal therewith; the first and second layers overlaying one another to form an integral plural-layer seal; means securely fastening the layers over the inlet opening in the fluid tight sealing relation thereto.

4,886,179

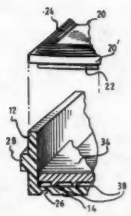
REUSABLE CONTAINER FOR A PIECE OF PIZZA PIE OR OTHER FOOD PRODUCT

William T. Volk, R.R. 2, Highview Dr., Wading Diver, N.Y. 11792

Filed Nov. 9, 1988, Ser. No. 269,120

Int. Cl.[4] B65D *85/36*

U.S. Cl. 220—23.4 **2 Claims**



1. An interlockable reusable container for a food product, especially for a leftover piece of pizza pie, comprising:

(a) a base shaped like the sector of a circle;

(b) two substantially flat side walls attached to said base and meeting in a common vertex;

(c) a rear wall attached to said side walls and said base;

(d) an exterior tongue member and/or tongue piece; and

(e) an exterior groove member and/or groove portion shaped to engage said tongue member or tongue piece on another of said reusable containers so that said reusable containers may be interlocked, said groove member extending along one of said side walls and said tongue member extending along the other of said side walls, said groove member being conformed according to said tongue member so that said reusable container can be laterally interlocked with another of said reusable containers to form a substantially flat package capable of holding two of said pieces of pizza pie, said reusable containers being made of a thermoplastic material which withstands a moderate heating necessary to warm a leftover food product for palatability and efficient digestion;

(f) a heat retention plate having a plurality of feet members shaped so just fit in said reusable container resting on said base of said reusable container with said feed members, said heat retention plate being made of a ceramic material

(g) a removable lid which rests on said side walls when used to cover said container, said removable lid comprises a lid panel which rests on said side walls, a plug member underneath said lid panel which fits snugly in the top opening of said reusable container when said lid is in place on said container, said lid panel having a peripherally running vertically extending one of said tongue pieces and said base having a corresponding peripherally running one of said groove portions, said tongue piece and said groove portion being so formed and positioned that two or more of said reusable containers can be interlocked and stacked vertically.

2. An interlockable reusable container for a food product, especially for a leftover piece of pizza pie, made of a thermoplastic material comprising:

a base shaped like the sector of a circle,

two substantially flat side walls attached to said base meeting in a common vertex, one of said side walls having an exterior tongue member and the other of said side walls having an exterior groove member corresponding to said tongue member shaped so that said reusable container is laterally interlockable with another of said reusable containers, a rear wall attached to said side walls and said base,

a removable lid positionable on said side walls having a lid

panel which rests on said side walls, a plug member which fits in the top opening of said reusable container when said lid is in place on said container, said lid panel having a peripherally running vertically extending exterior tongue piece and said base having a corresponding peripherally running exterior groove portion, said tongue piece and said groove portion being so formed that two or more of said reusable containers can be stacked vertically to form interlocked vertical reusable container stacks, and

a ceramic heat retention plate having a plurality of feet members shaped to just fit in said reusable container resting on said base of said reusable container with said feet members.

4,886,180

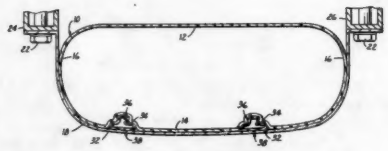
REINFORCEMENT FOR A PLASTIC FUEL TANK

John C. Bonczyk, Union Lake, Mich., assignor to Chrysler Motors Corporation, Highland Park, Mich.

Filed Dec. 9, 1988, Ser. No. 282,361

Int. Cl.[4] B60K *15/02*; B65D *88/12*

U.S. Cl. 220—5 A **5 Claims**



1. A plastic fuel tank for a vehicle having a reinforced bottom wall necessitated because the tank can only be supportingly attached to the associated vehicle at widely spaced intervals, comprising: a molded tank enclosure having an elongated channel molded in the bottom wall which extends between the widely spaced support intervals, the channel having a narrowed entrance portion and a widened interior portion adjacent the entrance portion; an elongated tubular plastic reinforcement member with a cross-sectional configuration substantially conforming to the shape of the channel, the member having a narrowed mid portion with an outer dimension corresponding to the width of the channel's narrowed entrance portion and an adjacent side portion having a slightly wider dimension corresponding to the widened interior portion of the channel; the plastic tank and reinforcement member being sufficiently resilient to allow pressing the member's wider side portion past the narrowed entrance portion and into the widened interior portion of the channel whereby the reinforcement member and the channel forming portions of the tank wall are tightly held together for rigidifying the bottom of the tank between the spaced intervals.

4,886,181

PLASTICS CONTAINER ASSEMBLY

Peter R. Haines, Skelmersdale, Great Britain, assignor to Lin Pac Mouldings Limited, Birmingham, United Kingdom

Filed Oct. 9, 1987, Ser. No. 107,786

Claims priority, application United Kingdom, Oct. 13, 1986, 8624533; Feb. 4, 1987, 8702459

Int. Cl.[4] B65D *6/00*

U.S. Cl. 220—67 **19 Claims**

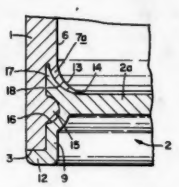
1. A plastics container assembly having an upstanding side wall and a base and which consists of a tubular wall part and a base closure part fitted to a bottom end of the wall part; one of the parts having a peripheral rib and the other part having a peripheral groove within which the rib is received to provide a fluid seal, said tubular wall part being held in snap-together engagement contact with said base closure part; one of said parts having a peripheral flange which closely overlies a peripheral bottom end face of the other part, and wherein inner surfaces of the wall part and closure part provide a smooth transition from one surface to the other and the effective peripheral junction within the container between the base and the side wall presents a smoothly curved concave profile.

18. A plastics container assembly having an upstanding side wall and a base and which consists of a tubular wall part and a base closure part fitted to a bottom end of the wall part;

one of said parts having a peripheral rib and the other part having a peripheral groove within which the rib is received to provide a fluid seal;

one of said parts having a peripheral flange which closely overlies a peripheral bottom end face of the other part;

said tubular wall part having an internal peripheral sealing flange adjacent to the closure part, said sealing flange being directed downward from the side wall to abutt the



closure part so as to provide a fluid seal and a smooth transition between the inner surfaces of said wall and closure parts, said abuttment also forming at least part of a smoothly curved concave profile presented by the effective peripheral junction between the base and the sidewall within the container, and

said closure part having a bottom wall extending substantially over the interior of the container bottom, a tubular extension wall extending upwardly from said bottom wall within and adjacent to the tubular wall part, said tubular wall part having a peripheral recess beneath and partly defined by the sealing flange, said upward tubular extension wall being receivable within said peripheral recess whereby the sealing flange overlies that upward extension wall.

4,886,182

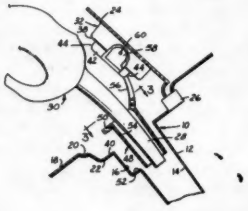
FUEL FILLER ASSEMBLY

William E. Fedelem, and Robert B. Hutter, both of Livonia, Mich., assignors to Chrysler Motors Corporation, Highland Park, Mich.

Filed May 26, 1989, Ser. No. 357,235

Int. Cl.[4] B65B *3/00*

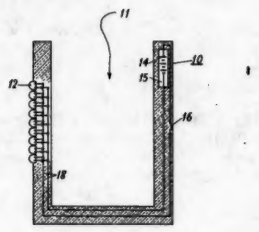
U.S. Cl. 220—85 F **5 Claims**



1. An improved fuel filler assembly for a fuel tank tubular inlet, comprising: a closure member pivotal between a closed operative position sealing the inlet tube and an opened operative position to allow a fuel pump's fill nozzle to enter the tube; a generally cylindrically shaped and tubular funnel member in the inlet tube and having a radially outwardly extending flange adapted to engage portions of the inlet to limit axial insertion of

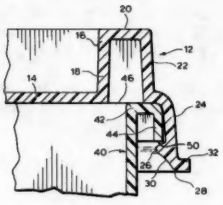
the funnel into the tube when in a closed operative position; a flexible strap extending between the funnel member and the pivotal closure member having a sufficient length so that the funnel is moved axially outward from the closed position to an axially outward opened position whereby the funnel is more accessible for conveniently receiving the fuel pump nozzle.

4,886,183
BEVERAGE CONTAINER HOLDER
Keith A. Fleming, Star Rte. 31, Ellsworth, Me. 04633
Filed Apr. 7, 1988, Ser. No. 178,990
Int. Cl.[4] F21K *2/00*
U.S. Cl. 220—85 H **3 Claims**



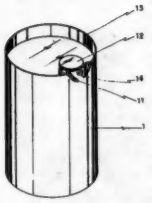
1. In a selectively illuminated beverage container holder, the combination comprising;
   a. a thermally insulated jacket for a beverage container,
   b. a plurality of lamps disposed in the insulated jacket,
   c. a source of electrical power to light the lamps,
   d. a pressure switch to connect the lamps to the source of electrical power.

4,886,184
PLASTIC CONTAINER LID
Arto Chamourian, Weston, Ontario, Canada, assignor to Hamelin Group Inc., Boucherville, Canada
Filed Jan. 23, 1989, Ser. No. 299,597
Int. Cl.[4] B65D *41/18, 43/03*
U.S. Cl. 220—306 **6 Claims**



1. A plastic container lid formed by injection molding and comprising
   a sheet-like main body portion,
   a downwardly-open upwardly-extending hollow annular projection extending around the periphery of the body portion, said upwardly-extending annular projection having an inner wall extending upwardly from the periphery of the body portion, a top wall extending radially outwardly from the top of the inner wall and an outer wall extending downwardly from the outer periphery of the top wall, said inner and outer walls being substantially equal in height,
   an annular skirt portion extending outwardly from the lower end of the outer wall and curving to extend downwardly to a lower annular edge,
   said skirt portion having an internal annular rib extending around and projecting inwardly from the inner surface of the skirt portion,
   said internal rib extending inwardly for a distance sufficiently short so as not to reach an imaginary vertical line extending downwardly from a radially outer limit of the outer wall of the upwardly-extending annular projection and the height of the upwardly-extending annular projection above the main body portion being greater than the depth of the skirt portion below the main body portion to enable the lid to be stacked upon a like lid with the lower ends of the inner and outer walls of the upwardly-extending annular projection of the upper lid engaging the top wall of the upwardly-extending annular projection of the lower lid.

4,886,185
STRUCTURE OF A CONTAINER AND CLOSURE
Chang C. Chuan, No. 32, Ching An Hsing Tswen, Ta PWU Rd., Chian Village, JWEI Fang Town, Taipei County, Taiwan
Filed Apr. 21, 1989, Ser. No. 341,158
Int. Cl.[4] B65D *39/00*
U.S. Cl. 220—307 **5 Claims**



1. A container and closure system, comprising:
   a. a housing formed by a body member having a cylindrical contour and a pair of respective top and bottom end members for defining an enclosed space therein;
   b. a bottle neck member having a cylindrical wall coupled to said top end member for providing fluid communication with said interior space of said housing to define an access opening for said housing, said neck member having an annular recess formed in an interior surface of said cylindrical wall, and a through opening formed in said cylindrical wall in juxtaposition with said annular recess;
   c. means for sealing said access opening releasably coupled to said bottle neck member, said sealing means includes a tubular engagement member extending longitudinally from a head member defining a hollow cavity closed on one end by said head member, said tubular engagement member having an annular notch formed in an external surface thereof;
   d. spring means disposed in said annular recess for releasably lockingly engaging said sealing means within said bottle neck member, said spring means includes an annular spring member disposed within said annular recess of said bottle neck member, and an operating member extending from said annular spring member through said bottle neck member through opening for coupling a force applied to said operating member to said annular spring member; and,
   e. a protective ring member extending a predetermined distance from said top end member for protecting said bottle neck member, said protective ring member having a height dimension substantially equal to a combined height of said bottle neck member and said sealing means head member.

4,886,186

PASTE DISPENSER

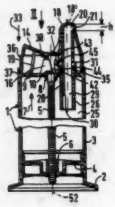
Raimund Andris, Tannhörnle 9, 7730 Villingen-Shwenningen 22, BRD, Fed. Rep. of Germany

Filed Mar. 30, 1988, Ser. No. 175,199

Claims priority, application Fed. Rep. of Germany, Mar. 30, 1987, 3710496

Int. Cl.[4] B67D *5/40*

U.S. Cl. 222—379 **9 Claims**



1. A paste dispenser for the delivery of dosed quantities of pasty substances such as toothpaste and similar materials, comprising a substantially cylindrical receptacle having a receptacle delivery tube with a delivery orifice adjacent its one end and which has an opposite end extending into said receptacle, a feed plunger arranged axially movable in said receptacle and having a manually operable push button portion for displacing said plunger, biasing means biasing said push button to a return position, a closing wall of said receptacle positioned adjacent said tubular member so as to close said delivery orifice, said delivery orifice being arranged facing in a radially outward direction at substantially right angles to an axis of said receptacle, said closing wall having a portion which at least in the area of said delivery orifice adjoins closely the outside of said tubular member in a position parallel to the axis of said receptacle, said delivery orifice being opened by movement of at least one of said tubular member and said closing wall, said push button being connected to at least one of said tubular member and said closing wall so as to move one relative to the other parallel to the axis of said receptacle, including a push rod centrally located in said receptacle and extending through the interior of said receptacle forming a reservoir, said push rod having a lower end connected to a delivery piston, said connection comprising a ratchet clutch, said delivery piston engaged around said push rod in the reservoir of said receptacle, said push rod having a lateral projection which engages said tubular member, said tubular member having a stop which is positioned to engage against said push rod, said push rod projection forming a lifting shoulder which engages against said stop arranged at substantially half the delivery orifice opening.

4,886,187

PLASTIC CONTAINER WITH ENHANCED INSULATION

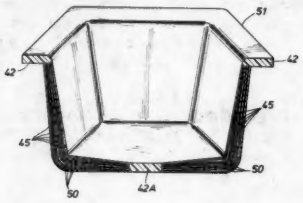
David R. Stewart, Richmond, Tex., assignor to Shell Oil Company, Houston, Tex.

Filed Sep. 14, 1988, Ser. No. 244,214

Int. Cl.[4] B65D *21/00*

U.S. Cl. 220—468 **1 Claim**

1. An insulated container having a shaped opening defined downwardly therein, said container comprising a plurality of shaped adjacent layers simultaneously warped from an initially planar orientation, the layer adjacent said opening strain hardened less than the adjacent layer, each successive layer strain hardened more than the adjacent layer located in a direction toward said shaped opening, wherein the outer edge of each of the adjacent layers has been commonly laminated to at least one adjacent layer, and wherein at least one of said layers is



dielectrically heatable, and at least one of said layer is dielectrically non-heatable.

4,886,188

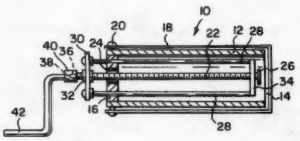
COMBINATION MANUAL OR IMPACT DRIVE ENHANCEMENT OF PORTABLE INJECTION TOOL

Gene A. Falco, 34 Windemere Way, Woodbury, N.Y. 11797

Filed Nov. 16, 1987, Ser. No. 121,287

Int. Cl.[4] B67B *7/00*; G01F *11/00*

U.S. Cl. 222—1 **3 Claims**



1. A method for delivering an adhesive system to a work site, comprising the steps of providing said adhesive system in a cartridge having an orifice at one end and a slideable plunger at the other, applying an axial force intermittently against said slideable plunger to push the adhesive system from said cartridge, said force being intermittently applied by an impact wrench.

4,886,189

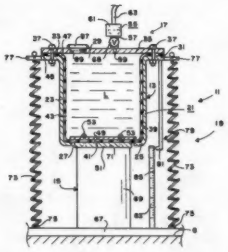
SYSTEM FOR SELECTIVELY CONTAINING METERING AND DISPENSING LIQUIDS

John A. Vanderjagt, 1395 Glen Oaks Dr., Memphis, Tenn. 38117

Continuation-in-part of Ser. No. 161,769, Feb. 29, 1988, abandoned. This application Aug. 8, 1988, Ser. No. 229,715

Int. Cl.[4] B67D *5/22*

U.S. Cl. 222—49 **26 Claims**



1. A system for selectively containing and dispensing liquid comprising:

(a) a container for liquid, said container including a housing having an interior and an opening in one end thereof and being open at the opposite end thereof, said housing including a flange at the edge thereof adjacent the open end thereof, a cover, means for removably mounting said cover means over the open end of said housing, a flexible diaphragm means in said interior of said housing for holding the liquid, said diaphragm means being provided with a flange at an edge thereof, said flange of said diaphragm means being sandwiched between said cover means and said flange of said housing to hold said edge of said diaphragm in place, and said diaphragm means being unattached to said housing along the sides of said housing;

(b) actuator means coupled to said diaphragm means for moving said diapahragm means between an extended position in which said diaphragm means can hold more of the liquid to a completely retracted position in which said diaphragm means holds less of the liquid than when in said extended position, said actuator means including a projection of a size adapted to extend through said opening in said one end of said housing, a first plate disposed over the end of said diaphragm means and a second plate disposed on the opposite side of said diaphragm means from said first plate, fneans joining said first and second plates together with the end of said diaphragm means being sandwiched therebetween, said second plate being of a smaller size than said opening in said one end of said housing whereby said second plate is adapted to extend into said opening, said first plate being of a larger size than said opening in said one end of said housing whereby the end of said housing is adapted to act as a stop to limit movement of said first and second plates and the end of said diaphragm means, said second plate being adapted to contact said projection whereby relative movement of said container and said projection towards one another into said completely retracted position is effective to displace the liquid from the interior of said container, said container and said actuator means being separable from one another whereby said container can be filled and sealed with liquid at a location remote from said actuator means and then transported to the location of said actuator means for joining with said actuator means to dispense the liquid from said container;

(c) discharge means comprising quick coupling means including a first part fixedly attached to said cover means and in communication with the interior of said housing and said diaphragm means and including a second part detachably connected to said first part and in communication with said first part and thereby in communication with the interior of said housing and said diaphragm means and conduit means coupled to said second part for conducting the expelled liquid to a place of use, and said discharge means including valve means for controlling the discharge of the liquid; and

(d) force transmitting means coupled to said actuator means for causing said actuator means to move said diaphragm means in a direction from said extended position towards said completely retracted position to dispense the liquid from said container and out said discharge means.

4,886,190

POSTMIX JUICE DISPENSING SYSTEM

Jonathan Kirschner; Kenneth G. Smazik, both of Marietta, and Gary V. Paisley, Lilburn, all of Ga., assignors to The Coca-Cola Company, Atlanta, Ga.

Continuation-in-part of Ser. No. 924,381, Oct. 29, 1986, abandoned. This application Dec. 23, 1987, Ser. No. 137,307

Int. Cl.[4] B67D *1/10, 5/08, 5/56, 5/62*

U.S. Cl. 222—57 **4 Claims**

1. Apparatus for reconstituting and dispensing juice comprising:

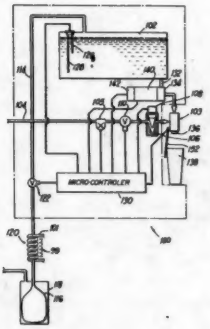
(a) a pressurizable canister adapted to hold and dispense a quantity of pliable juice concentrate at a temperature below 32° F., and means for pressurizing said canister;

(b) a mixing chamber and a nozzle for dispensing a beverage therefrom;

(c) a concentrate conduit extending from said canister to said mixing chamber, whereby pressure in said canister forces concentrate into said concentrate conduit;

(d) a water conduit extending into said mixing chamber;

(e) means for heating concentrate in said concentrate conduit;



(f) metering means in said conduits for controlling the ratio of water to concentrate fed to said mixing chamber, said metering means includes a gerotor pump for said concentrate and a poppet valve at the outlet of the pump to prevent concentrate from leaking out of said pump; and

(g) a check valve immediately downstream from said poppet valve to prevent water from said water conduit from flowing upstream from said mixing chamber through said pump when said pump is not operating.

4,886,191

TOOL FOR ASSISTING SPRAY WORK AT HIGH POSITION

Shingo Yoshitomi, Ikeda, Japan, assignor to Kabushiki Kaisha Araki Gomu, Osaka, Japan

Division of Ser. No. 81,425, Aug. 4, 1987, Pat. No. 4,789,084. This application Apr. 5, 1988, Ser. No. 177,754

Claims priority, application Japan, Dec. 19, 1986, 61-304964; May 16, 1987, 62-119326

Int. Cl.[4] B67D *5/64*

U.S. Cl. 222—174 **5 Claims**

1. A tool for assisting spray work at a high position, comprising:

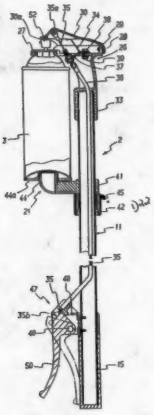
a pole;

an upper holder being fixed on an upper end of said pole, laterally extending and having a fitting portion for holding a neck portion of a spray device, said fitting portion having a circular through hole through which said neck portion is to be inserted such that said fitting portion abuts upon a semi-spherical portion of said neck portion;

a lower holder having a tubular portion slidably mounted on said pole, an arm laterally extending from said tubular portion and an elevated receiving portion provided at a free end of said arm for supporting a concaved lower surface of said spray device, said elevated receiving portion having a diameter substantially smaller than that of said spray device;

a clamping means for fixing said tubular portion on said pole;

a valve-opening mechanism for opening an ejecting valve of said spray device; and



an operating means for remotely operating said valve-opening mechanism from a lower end portion of said pole.

4,886,192

LIQUID SOAP DISPENSER

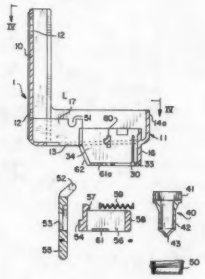
Antonio M. Cassin, Milan, Italy, assignor to Steiner Company, Inc., Chicago, Ill.

Continuation of Ser. No. 832,419, Feb. 24, 1986, abandoned. This application May 27, 1987, Ser. No. 56,352

Claims priority, application Italy, May 20, 1985, 20792 A/85

Int. Cl.[4] B67D *5/06*

U.S. Cl. 222—181 **13 Claims**



1. A liquid soap dispenser comprising a L-shaped bracket having a vertical rear plate adapted to be mounted on a wall and having a horizontal base having a bottom wall, two side walls and a front wall; a tank shaped to be supported on said bottom wall and housed within a space defined by said rear plate and said side walls and front wall, said tank having a hollow downwardly projecting portion of generally cylindrical shape having a substantially flat bottom with a central hole therein of reduced diameter compared to said bottom, a flexible slitted flat diaphragm which in use abuts said flat bottom with said central hole being in registry with the slit in said flat diaphragm to form a back check valve integral with said tank, a pump mechanism including a deformable nozzle in fluid communication with said tank for dispensing soap from said tank in discrete doses and a cover removably mounted on said tank, the pump mechanism is slid into the L-shaped bracket and combined with the tank so that the back check valve is integral with the tank.

4,886,193

CONTAINER CLOSURE CAP WITH METERING APPLIANCE

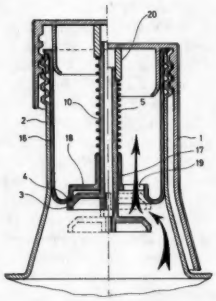
Victor Wassilieff, Paris, France, assignor to Creanova AG., Zurich, Switzerland

Filed Jul. 1, 1987, Ser. No. 68,993

Claims priority, application France, Jul. 8, 1986, 86 09927; Feb. 5, 1987, 87 01415

Int. Cl.[4] G01F *11/28*

U.S. Cl. 222—446 **9 Claims**



1. A metering and dispensing device for fluid product contained in a container sealingly closed by a removable closure cap, with a metering chamber delimited by a cylindrical wall fixedly and sealingly inserted in a neck of said container and closably opened, at its lower end, by an axially displaceable valve member, fixedly connected to an upwardly extending stem, and closed, at its upper end, by the bottom wall of said closure cap and with means for displacing the valve member in its opening direction when said closure cap is in its position for closing the container and for returning the valve to its closing position before removing said closure cap;

said cylindrical wall has, at its lower end, an inlet opening and an associated valve seat,

said closure cap is adapted, on displacement toward its position for closing said container, to push said valve member stem in a direction for moving said valve member off said valve seat, and said means for displacing said valve member include resilient means for returning said valve member towards said valve seat in response to displacement of said closure cap in the opposite direction;

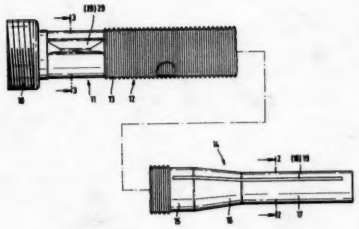
said resilient means include a spring element circumscribing said valve stem, and;

an internal cylindrical surface portion of the upper rend portion of said cylindrical wall is slidingly and sealingly engaged by a cylindrical portion of said closure cap during outward axial displacement relative to said neck of said container until after said valve member is seated to thereby prevent flow through the cylindrical wall's upper end prior to the seating of the valve member.

4,886,194
DISCHARGE TUBE

Wolfram Schiemann, Eugen-Nagele-Strasse 17, 7140 Ludwigsburg, Fed. Rep. of Germany

Filed Mar. 25, 1988, Ser. No. 173,089
Claims priority, application Fed. Rep. of Germany, Jul. 31, 1987, 3725389
Int. Cl.[4] B67D *3/00*
U.S. Cl. 222—478 12 Claims



1. A flexible walled discharge tube of plastic for attaching to a fuel can having an air channel for facilitating liquid flow, comprising

a first tube section,

a second tube section for introducing into a vehicle filler pipe,

a central tube section between said first and said second tube sections having bellows-type peripheral grooves that is made flexible by means of said bellows-type peripheral grooves,

said central tube section being in a flexible, bent condition when said second tube section is introduced into said vehicle filler pipe, and

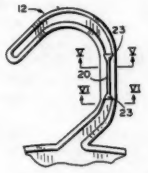
axially parallel depressions on the wall of said discharge tube that form a partition wall in the cross-section of said discharge tube to partition said air channel of said discharge tube,

said partition wall being discontinued over the length of said central tube section provided with said bellows-type peripheral grooves whereby the cross-section thereof is clear and circular.

4,886,195
SIZE IDENTIFICATION SYSTEM FOR NESTING HANGERS

Russell O. Blanchard, Zeeland, Mich., assignor to Batts, Inc., Zeeland, Mich.

Filed Dec. 19, 1988, Ser. No. 286,158
Int. Cl.[4] A47G *25/32*
U.S. Cl. 223—85 7 Claims

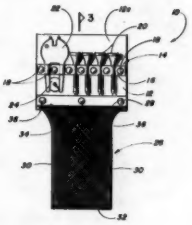


1. A garment hanger having a body and a molded plastic support hook, said support hook having forward and rear faces and a straight vertical portion spaced from both the body of the hanger and the top of the hook, said portion being offset forwardly to form a pair of vertically elongated panels having flat faces, said panels being integral with each other along one of their edges and at their juncture forming an apex, said portion being hollow and forming a pocket opening through the rear face of said hook into which the apex of a similar offset portion can be seated when a pair of said hangers are nested together with the front face of one in abutment with the rear face of the other of said pair and the rearwardly extending portions of said hook and body aligned with each other.

4,886,196
BODY WORN GOLF ACCESSORY DEVICE

Patrick E. Plummer, Rte. 6, Box 507, Fayetteville, N.C. 28311

Filed Jun. 29, 1989, Ser. No. 373,246
Int. Cl.[4] B65D *30/10*
U.S. Cl. 224—235 5 Claims



1. A body worn golf accessory carrier, comprising:

(a) a generally flat backing having an outer and inner surface;

(b) a golf tee holding structure formed across the outer surface of the backing for receiving and holding a series of golf tees;

(c) a stretchable fabric ball holder secured to and depending from the backing for holding a plurality of golf balls;

(d) the stretchable ball holder including an open top, a surrounding side structure, and a closed bottom;

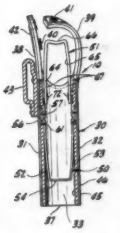
(e) means for stretching the open top of the ball holder and securing the open top to the backing in a stretched posture such that the side structure of the ball holder tapers inwardly from the stretched top opening; and

(f) means secured to the backing for permitting the golf accessory carrier to be worn about a person.

4,886,197
ANTI-THEFT HOLSTER

Dale D. Bowles, 2443 Hemlock, and Charles L. Parmley, 23 Kelly Dr., both of Granite City, Ill. 62040

Filed May 27, 1988, Ser. No. 199,800
Int. Cl.[4] F41C *33/04*
U.S. Cl. 224—243 18 Claims



1. An anti-theft holster for a pistol, comprising a holster body shaped to form a sheath with an interior chamber for housing the pistol and having a lower muzzle end and an upper pistol receiving opening, lock strap means on said holster body adjacent to said upper opening including at least one strap

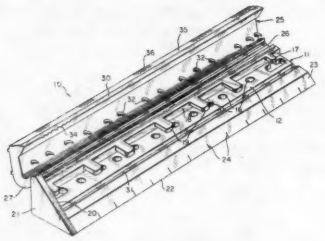
member foldable over a butt portion of a pistol housed in said sheath chamber, resilient means constructed and arranged within the sheath chamber adjacent to the muzzle end for yieldably seating the muzzle end of the pistol, and non-yielding means adjacent to the upper opening for positively engaging and retaining the butt end of the pistol within said sheath chamber in opposed relation to said resilient means, said non-yielding means being movable relative to said upper opening between said operative pistol engaging position and an inoperative pistol releasing position when the pistol is depressed in the holster body against said resilient means.

4,886,198

DEVICE FOR SEPARATING PERFORATED STRIPS FROM PAPER SHEETS

Pierre J. de Larosiere, 30 Duque de Palmela, 4C 1200, Lisbon, Portugal

Continuation of Ser. No. 936,799, Dec. 2, 1986, abandoned. This application Aug. 5, 1988, Ser. No. 228,713
Int. Cl.[4] B26F *3/02*
U.S. Cl. 225—106 11 Claims



1. A device for separating the perforated transport edge or strip from sheets of computer paper or the like, wherein the strip is joined to the sheet via a frangible tear line, comprising:

a main body having limit stop means for engaging and accurately positioning a sheet of paper or the like placed thereon;

a top hinged to the main body at a hinge means along one side and adapted to be swung from a first position overlying the main body to a second position away from the main body;

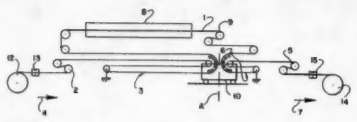
means on said top for engaging and holding the narrow strip while the sheet is pulled away from the device, thus tearing the strip from the sheet, said means comprising a plurality of openings in said main body and a plurality of hook-like teeth on said top projecting therefrom in positions to extend into the openings when the top is in its first position, said limit stop means configured to position the paper placed thereagainst so that the perforations in the transport strip are aligned with the openings in the main body, whereby said hook-like teeth extend through the openings in the strip and into the openings in the body to hold the strip securely in place when the top is in its first position.

4,886,199

STRIP DRIVE FOR ADVANCING MATERIALS FOR PROCESSING

Oskar Noe; Rolf Noe; Andreas Noe, all of Müilheim; Willi Dötsch, Oberhausen, and Herbert Lux, Mülheim, all of Fed. Rep. of Germany, assignors to Bergwerk-und Walzwerk-Maschinenbau GmbH, Duisburg, Fed. Rep. of Germany

Filed Jul. 8, 1988, Ser. No. 216,871
Claims priority, application Fed. Rep. of Germany, Jul. 10, 1987, 3722783; Dec. 23, 1987, 3743763
Int. Cl.[4] B65H *20/24*
U.S. Cl. 226—118 20 Claims



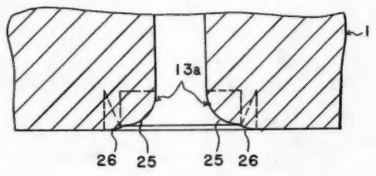
1. An apparatus for treating strips of material such as metal, plastics, paper and the like comprising a strip drive having an entry end and an exit end, a strip store disposed at said entry end and said exit end, a processing section being disposed between two stores, a strip drive unit disposed after said processing section, each strip store comprising a horizontally movable loop trolley, means mechanically interconnecting said loop trolleys independently of the strip to form a horizontally movable unit, a strip drive unit being located at said entry end and said exit end and being operative as drives for moving the interconnected loop trolleys, said strip drive units being one of speed controlled drives and torque controlled drives.

4,886,200

CAPILLARY TIP FOR BONDING A WIRE

Kiyoaki Tsumura, Itami City, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Japan

Filed Aug. 10, 1988, Ser. No. 230,376
Claims priority, application Japan, Feb. 8, 1988, 63-25683
Int. Cl.[4] B23K *20/10*
U.S. Cl. 228—1.1 4 Claims



1. A capillary tip for bonding a wire by pressing a metal ball formed at the end of the wire against the material to be bonded to deform the ball plastically and to bond the ball and the material to be bonded by interdiffusion of the ball and the material to be bonded while applying heat to the material to be bonded and ultrasonic vibrations to the deformed ball comprising:

a flat loading surface for pressing a metal ball;

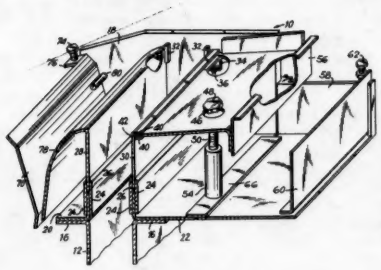
a through-hole of circular cross-section open to said loading surface for passing a wire of circular cross-section therethrough, the wire having the ball at one end;

a convex surface connecting said flat loading surface and said through-hole continuously and smoothly wherein the convex surface includes a generally conical surface on which are circumferentially superposed a plurality of convex surfaces of generally uniform partially spherical cross-section, the cross-sectional radii of said convex surfaces being smaller than the diameter of the wire.

4,886,201
SOLDER WAVE NOZZLE CONSTRUCTION

Carlos Deambrosio, Laprairie, Canada, and James M. Morris, Eldridge, Mo., assignors to Electrovert Limited, Ontario, Canada

Filed Jun. 9, 1988, Ser. No. 204,452
Int. Cl.[4] B23K *3/06*
U.S. Cl. 228—37 **16 Claims**



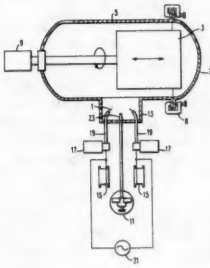
1. In a wave soldering apparatus including a solder reservoir, a chimney flow duct and pump means to pump solder from the solder reservoir up through the chimney flow duct, the improvement of a solder nozzle construction comprising:

a solder nozzle duct to fit over the chimney flow duct, the solder nozzle duct having stop means on the inside, positioned below the solder nozzle duct to provide a seat for the solder nozzle positioned over the chimney flow duct, and quick connect and disconnect means on the outside at each side of the chimney flow duct to hold the solder nozzle in position over the chimney flow duct.

4,886,202
METHOD OF MAKING METAL MATRIX MONOTAPE RIBBON AND COMPOSITE COMPONENTS OF IRREGULAR SHAPE

Robert L. Ammon, Baldwin Borough, Pa., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Nov. 7, 1988, Ser. No. 268,145
Int. Cl.[4] B23K *9/00, 9/04;* B05D *1/02;* C23C *7/00*
U.S. Cl. 228—120 **8 Claims**



1. A method of fabricating irregular shapes wrapped with metal matrix composite monotape comprising the steps of:

wrapping a cylindrical drum with an array of fibers disposed on a predetermined pitch so as to form a spiraling path in which each wrap of the array is disposed on the drum adjacent the previous wrap;

overlaying the fiber wrapped cylindrical drum with molten metal utilizing an arc spray;

cutting the solidified overlay following a spiraling path so as not to cut any of the fibers;

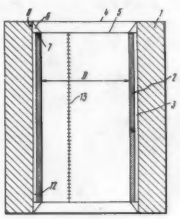
removing the cut overlay from the cylindrical drum in the form of a ribbon of metal matrix composite monotape with generally parallel side margins; and

wrapping the irregular shape with the ribbon in a spiral configuration so that the side margin of one wrap is adjacent the opposite side margin of the adjacent wrap.

4,886,203
METHOD OF PRODUCING BY BRAZING BIMETALLIC CYLINDRICAL ARTICLES

Leonid G. Puzrin, ulitsa Tarasovskaya, 18, kv. 17, Kiev; Miron G. Atroshenko, ulitsa Yakira, 21, kv. 12, Kiev; Vladimir L. Yaremenko, ulitsa Moskovskaya, 5, kv. 18, Kiev; Jury Y. Ischenko, Fastovsky raion, poselok Borovaya pereulok Krasny, 7, Kievskaya oblast; Pavel S. Nefedov, ulitsa Kazantseva, 18a, kv. 25, Donetskaya oblast, Zhdanov; Ivan G. Pescherin, prospekt Metallurgov, 199, kv. 33, Donetskaya oblast, Zhdanov; Ilya P. Serebryanik, ulitsa K. Libknekhta, 98, kv. 2, Donetskaya oblast, Zhdanov, and Evgeny I. Polev, prospekt Illiicha, 52, kv. 57, Donetskaya oblast, Zhdanov, all of U.S.S.R.

Filed Apr. 20, 1988, Ser. No. 184,089
Int. Cl.[4] B23K *31/02, 31/06*
U.S. Cl. 228—126 **10 Claims**



1. A method of brazing of an outer carbon steel sheel and an inner stainless steel shell comprising the steps of:

forming said inner shell having ends and longitudinal edges by rolling up a sheet of stainless steel material in an overlap fashion so that the portions of said sheet material adjacent said longitudinal edges overlap to define a contact zone therebetween;

placing said rolled up sheet material and braze material inside the outer shell with a clearance between the inner surface of said outer shell and the outer surface of the inner shell;

placing a braze material onto the outer surface of the said rolled up sheet material so that it engages both the inner surface of said outer shell and the outer surface of the inner shell;

forcing said rolled up sheet material to said inner surface of the outer shell until its longitudinal edges are butted and said contact zone is eliminated;

joining said longitudinal edges of said sheet material by a longitudinal weld to obtain said inner shell;

evacuating air from said clearance;

joining said ends of said inner and outer shells by circular vacuum-tight corner welds;

heating said outer shell with said inner shell mounted therein for brazing; and

cooling said outer shell, said inner surface of which is joined by brazing with said inner shell.

4,886,204

FOOD CONTAINER WITH RIBBED LID LOCKING MECHANISM

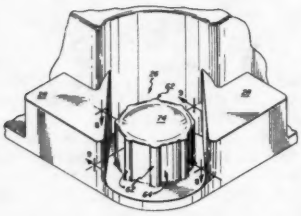
Danny Kalmanides, Orange, Conn., assignor to Inline Plastics Corporation, Milford, Conn.

Continuation-in-part of Ser. No. 34,616, Apr. 6, 1987, Pat. No. 4,771,934. This application Jun. 24, 1988, Ser. No. 211,438

The portion of the term of this patent subsequent to Sep. 20, 2005, has been disclaimed.

Int. Cl.[4] B65D *1/34*

U.S. Cl. 229—2.5 R **15 Claims**



1. A container for carrying food comprising:

a tray portion,

a lid portion directly hinged to the rear of said tray portion for movement towards and away from said tray portion to open and close the same, and

means for locking said lid portion to said tray portion,

said locking means including:

a horizontal flange extending around the periphery of said tray portion,

a horizontal flange extending around the periphery of said lid portion adapted to be seated on the horizontal flange of said tray portion,

one or more upright male elements extending upwardly from said horizontal flange on said tray portion towards said lid portion,

one or more upright female elements extending upwardly from said horizontal flange on the periphery of said lid portion in positions corresponding to those of said one or more upright male elements, each of said one or more female elements having an open end for receiving one of said one or more upright male elements in interlocking engagement as said lid portion is folded over said tray portion in a closed position, and each of said one or more female elements. including one or more ribs disposed in the side wall of said female element and extending substantially to the open end thereof, and

raised lands extending upwardly from said horizontal flange on the periphery of said lid portion and being discrete from said one or more female elements, said lands being provided on opposite sides of and adjacent to each of said one or more upright female elements on said horizontal flange of said lid portion.

10. A container for carrying food comprising:

a tray portion,

a lid portion directly hinged to the rear of said tray portion for movement towards and away from said tray portion to open and close the same, and

means for locking said lid portion to said tray portion,

said locking means including:

a horizontal flange extending around the periphery of said tray portion,

a horizontal flange extending around the periphery of said lid portion adapted to be seated on the horizontal flange of said tray portion,

one or more upright male elements extending upwardly from said horizontal flange on said tray portion towards said lid portion,

one or more upright female elements extending upwardly from said horizontal flange on the periphery of said lid portion in positions corresponding to those of said one or more upright male elements, each of said one or more female elements having an open end for receiving one of said one or more upright male elements in interlocking engagement as said lid portion is folded over said tray portion in a closed position and having a closed end surface opposite said open end, said closed end surface being indented towards said open end, and

raised lands extending upwardly from said horizontal flange on the periphery of said lid portion and being discrete from said one or more female elements, said lands being provided on opposite sides of and adjacent to each of said one or more upright female elements on said horizontal flange of said lid portion.

4,886,205

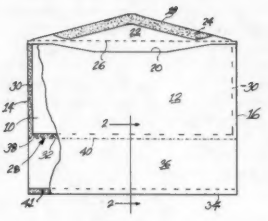
EASILY FEEDABLE ENVELOPE CONSTRUCTION

David H. Schnitzer, Buffalo Grove, Ill., assignor to Uarco Incorporated, Barrington, Ill.

Filed Sep. 22, 1988, Ser. No. 247,716

Int. Cl.[4] B65D *27/00*

U.S. Cl. 229—68 R **9 Claims**



1. An envelope construction designed for feeding into stacks without hanging up on a subjacent envelope in the stack comprising:

a pair of superimposed sheets of paper or the like and having aligned opposed side edges;

a third edge of one of said sheets extending between said side edges being enlarged in comparison to the third edge of the other sheet and carrying an adhesive to define a sealable flap for the envelope;

a U-shaped pattern of adhesive securing said sheets together, the legs of said U-shaped pattern being closely adjacent respective ones of said side edges and terminating near said third edge, the bight of said U-shaped pattern being spaced from said third edge and from a fourth edge of said sheets so as to define an envelope pocket opening at said third edges, and an envelope extension extending approximately from said bight to said fourth edge; and

a line of perforation in said extension closely adjacent and generally parallel to said bight whereby said extension may be removed from the envelope after feeding and before mailing, the distance between said line of perforation and fourth edge being at least one inch.

4,886,206

DISPOSABLE CONTAINER WITH FOLDABLE SPOUT

Beatrice E. Martinez, 1401 Middlebury Dr., Alexandria, Va. 22307

Filed Jul. 11, 1988, Ser. No. 217,410

Int. Cl.[4] B65D *5/74*

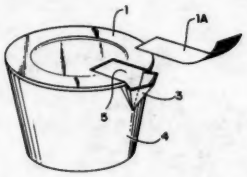
U.S. Cl. 229—123.1 **17 Claims**

1. A disposable container adapted to hold and dispense condiments and the like, comprising:

a cup member with an arcuate sidewall including a foldable spout member adjacent an upper edge portion thereof;

a cover member secured to said upper edge portion; and

a pull-strip adapted to overlie said foldable spout member and to be secured to said container to thereby seal said container and maintain the foldable spout in a folded



position without leakage during periods of storage, said pull-strip being at least partially releasable from said container, whereupon said foldable spout expands outwardly to a pouring position.

4,886,207

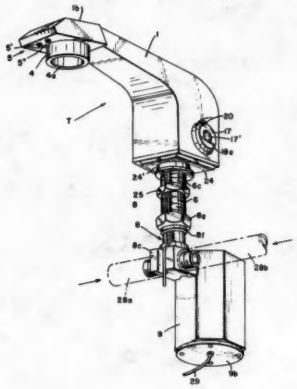
AUTOMATIC MIXING FAUCET

Chang H. Lee, 300 Winston Dr., Apt. 810, Cliffside Park, N.J. 07010, and Young J. Kim, 103-4, Ko Chuck-Dong, Ku-Ro-ku, Seoul, Rep. of Korea

Filed Sep. 14, 1988, Ser. No. 244,135

Int. Cl.[4] G05D *23/185;* F16K *31/02*

U.S. Cl. 236—12.12 5 Claims



1. An automatic water tap comprising a hot and cold water mixing valve, sensing means for sensing the presence or absence of an object beneath the tap; and an automatic water supply valve means connected to said mixing valve and being operative in response to said sensing means to control water flow from the tap, said water supply valve means including an electric motor, cam means operatively connected to said electric motor for rotation thereby, a pair of pilot valve means operatively engaged with said cam means for selective operation thereby, and a main valve operatively connected to and controlled by said pilot valve means to open or close water supply through the water supply valve means in response to operation of said pilot valves; control means responsive to said sensing means for energizing and deenergizing said motor.

4,886,208

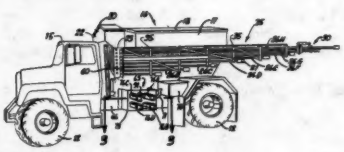
LIQUID HERBICIDE ATTACHMENT FOR GRANULAR APPLICATOR

Glen L. Strand, Murdock, Minn., assignor to Tyler Limited Partnership, Benson, Minn.

Filed Jul. 1, 1988, Ser. No. 213,958

Int. Cl.[4] A01C *15/04*

U.S. Cl. 239—77 12 Claims



1. For use in combination with an air conveying system for conveying particulate materials through conduits for distribution onto the surface of the ground, the improvement comprising a liquid pesticide injector attachment, said pesticide injector attachment including means for providing a metered amount of pesticide, and means for injecting the metered amount of pesticide in a flowable, nonatomized liquid form as it is introduced into a conduit carrying air entrained particulate material past the means for injecting, to thereby have the liquid pesticide material carried by the particles and air stream to the outlet of the conduit.

4,886,209

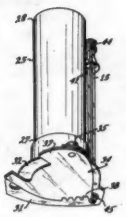
POP-UP SPRINKLER WITH ANTI-CLOGGING VALVE

Alan W. Dawn, San Clemente, Calif., assignor to James Hardie Irrigation, Inc., Laguna Niguel, Calif.

Filed Nov. 13, 1987, Ser. No. 120,409

Int. Cl.[4] B05B *3/16*

U.S. Cl. 239—116 22 Claims



1. A sprinkler apparatus, comprising:

a housing having a hollow interior, upper and lower ends and an inlet port through which to supply a flow of liquid to the interior;

a stem mounted within the interior of the housing to enable movement of the stem upwardly under influence of the flow of liquid from a retracted position to an extended position, the stem defining a passage that extends to a downwardly facing opening through which the flow of liquid can flow from the interior of the housing into the passage;

a surface circumscribing the downwardly facing opening;

a valve element dimensioned and arranged in confronting relationship with the surface to at least partially block the opening;

means for mounting the valve element on the stem to enable pivotal movement of the valve element about an axis of rotation to vary an amount by which the valve element blocks the opening, the axis of rotation of said valve ele-

ment being radially outside said downwardly facing opening; and

means for moving the valve element so that the valve element restricts the flow of liquid through the opening a selected amount.

4,886,210

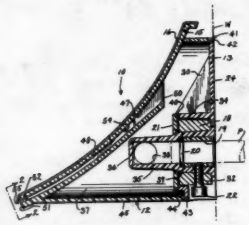
SHEET FLOW SPOUT

Thomas E. Gaffney, Sheboygan, Wis., and Patrick S. Wahlen, West Lafayette, Ind., assignors to Kohler Co., Kohler, Wis.

Division of Ser. No. 2,842, Jan. 13, 1987, Pat. No. 4,823,409. This application May 25, 1988, Ser. No. 198,345

Int. Cl.[4] B05B *1/36*

U.S. Cl. 239—193 **3 Claims**



1. A spout for providing a flow of water in the shape of a sheet, comprising:

inlet means for connection to a water supply for admitting a flow of water to the spout;

a reservoir downstream of the inlet means for accumulating the water admitted through the inlet means;

an elongated outlet downstream from the reservoir for permitting the water to exit the spout;

a weir having a crest in communication with the reservoir; and

a flow chamber extending from the crest to the outlet;

wherein the flow chamber has a center section and side sections, the center section being thinner top to bottom than the side sections, being arcuate in each of two orthogonal directions, and diverging in width in the direction of flow, wherein one of said two orthogonal directions is in the direction of flow and the other of said directions is transverse to the direction of flow, a first radius defines the center section in the flow direction to be concave up, and a second radius defines the center section in the transverse direction to be convex up; and

wherein the water pooled in the reservoir flows over the top of the crest to initially form a sheet shape and then flows through the flow chamber to exit the spout past the outlet in the form of a sheet.

4,886,211

ROTARY SPRINKLERS

Amir Cohen, Yuvalium, Israel, assignor to Agroteam Consultants Ltd. 2, Timrat and Plastro-Gvat, Kibbutz Gvat, both of, Israel

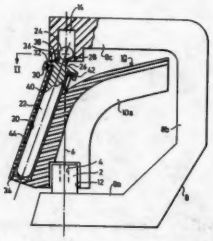
Filed Mar. 29, 1988, Ser. No. 174,732

Claims priority, application Israel, May 13, 1987, 82513

Int. Cl.[4] B05B *3/08*

U.S. Cl. 239—222.17 **11 Claims**

1. A rotary sprinkler including a nozzle producing a jet axially of the nozzle; a rotor; a pin rotatably mounting said rotor at one end of said nozzle; said rotor being formed with a groove configured to receive the axial jet and to deflect it laterally of the nozzle; said rotor also being formed with a socket receiving said pin so as to be rotatable with respect thereto and also to be axially movable with respect to said nozzle so as to close the nozzle opening when the sprinkler is not operating; a bridge secured to the nozzle and including a leg formed with a socket vertically aligned with the nozzle; said pin having a head at one end non-rotatably received within said bridge socket; said rotor socket being inclined at an



acute angle with respect to the axis of the nozzle and bridge socket; and a high viscosity fluid in said rotor socket effective to apply a retarding force to the rotor during its rotation with respect to said pin.

4,886,212

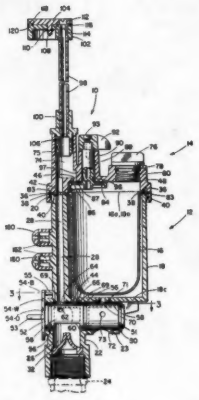
SPRAYING DEVICE HAVING CONTROLLED ADDITIVE FLUID FEED AND A TELESCOPING SPRAY TUBE ASSEMBLY

Rudy R. Proctor, Costa Mesa, and Fred M. Reinstein, Encino, both of Calif., assignors to Turbo Tek Enterprises, Inc., Los Angeles, Calif.

Continuation of Ser. No. 45,562, May 4, 1987, abandoned, which is a continuation of Ser. No. 713,824, Mar. 20, 1985, Pat. No. 4,682,734. This application Dec. 22, 1988, Ser. No. 289,434

Int. Cl.[4] B05B *3/00, 7/04, 15/10*

U.S. Cl. 239—315 **36 Claims**



1. A hand-held spraying device having controlled additive fluid feed, which comprises:

conduit means for conveying fluid between an entrance orifice and a single discharge orifice from which both a primary fluid and an additive fluid are discharged from the device;

connecting means on the conduit means adjacent the entrance orifice of the device for connecting the conduit means to a source of the primary fluid;

collapsible chamber means for holding a supply of the additive fluid, the chamber means being in communication

with the conduit means and being collapsible in response to external pressure to dispense the additive fluid into the conduit means;

a housing assembly for the collapsible chamber means, the housing assembly comprising a housing having at least one open end and an opposite end, the device conduit means having the single discharge orifice formed therein adjacent one of the ends of the housing, and having the device entrance orifice formed therein adjacent the other end of the housing, and the housing assembly having a first orifice through which the primary fluid can flow from the conduit means to exert pressure on the collapsible chamber means, and having a second orifice through which the additive fluid can flow from the collapsible chamber means into the conduit means;

a cap member forming part of the housing assembly in covering relationship to the open end of the housing of the housing assembly, the conduit means extending along one side of the housing from adjacent the open end of the housing and the cap member to the opposite end of the housing; and

control valve means disposed in the conduit means for selectively diverting at least a portion of the primary fluid at an upstream portion of the conduit means through the first orifice such that the primary fluid exerts external pressure on the chamber means to cause the chamber means to collapse and dispense the additive fluid through the second orifice into a downstream portion of the conduit means;

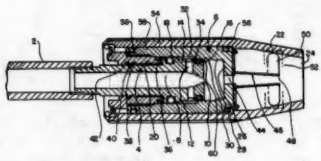
the control valve means being movable from an inoperative position in which no primary fluid flows through the conduit means and from the single discharge orifice, into a first operative position in which the control valve means permits only the primary fluid to flow through the conduit means and from the discharge orifice, and into a second operative position in which the control valve means diverts a portion of the primary fluid such that the diverted primary fluid flows through the first orifice and exerts external pressure on the chamber means to cause the additive fluid in the chamber means to be dispensed through the second orifice into the primary fluid flowing through the conduit means, for mixing the additive fluid in the primary fluid and discharging the resulatnt mixture from the device through the discharge orifice.

4,886,213

EJECTION NOZZLE FOR HIGH-PRESSURE CLEANING UNITS

Olav A. Kristensen, Aarhus, Denmark, assignor to K.E.W. Industri A/S, Hadsund, Denmark

Filed Nov. 21, 1984, Ser. No. 673,856
Claims priority, application Denmark, Nov. 25, 1983, 5390-83
Int. Cl.[4] B05B *1/12*
U.S. Cl. 239—458 **4 Claims**



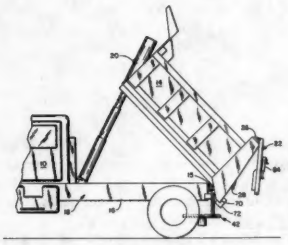
1. An ejection nozzle for high-pressure cleaning apparatus, comprising an inlet duct having a terminating narrow opening of a nozzle portion for high-pressure ejection, one or more side ducts branching out from said inlet duct, said one or more side ducts terminating in an annular space around said high-pressure nozzle portion, said space being forwardly open or openable in an annular area through such a large opening area that low-pressure discharge of a spraying liquid can occur, operating means for opening and closing this discharge through said one or more side ducts and said annular space, a protruding slidable cylinder jacket portion being outside the said annular area and having a shoulder face of sufficient area that during high-pressure ejection liquid pressure against said shoulder face is effective to maintain said operating means in position to close said low-pressure discharge through said one or more side ducts to maintain high pressure ejection in the nozzle, said cylinder jacket portion having a terminating end wall at a distance in front of said high-pressure nozzle portion, said end wall having a central, comparatively wide low-pressure nozzle opening, essentially coaxial with said high-pressure nozzle portion, said operating means comprising said cylinder jacket portion, which-by axial sliding-can cause opening and closing of the discharge through said annular area, said cylinder jacket portion being operable in such a way that discharge through said annular area is possible when said low-pressure nozzle opening is located at a maximum distance in front of said high-pressure nozzle portion.

4,886,214

DUMP TRUCK WITH INTEGRATED SPREADER SYSTEM

Charles S. Musso, Jr., Hammondsport, and Tom W. Musso, Bath, both of N.Y., assignors to Air-Flo Mfg. Co. Inc., Prattsburg, N.Y.

Filed Oct. 3, 1988, Ser. No. 252,671
Int. Cl.[4] A01C *19/00*; B60P *1/04*
U.S. Cl. 239—676 **8 Claims**



1. In a dump truck having a truck frame with longitudinally extending rails, a dump body having a forward end and a rear end and pivotally mounted at the rear end thereof on the truck frame, a lift cylinder connected between the truck frame and the forward end of the dump body for raising and lowering the dump body between a lower normal position thereof resting on the truck frame and an upper raised position thereof, the dump body forming a receptacle with a generally flat bottom an upright sidewall at each side of the bottom and a rear tailgate opening between the sidewalls and having a tailgate with an upper end and pivotal at the upper end thereof between an open position thereof and a closed position thereof closing the tailgate opening and latching means for latching the tailgate in its closed position, the dump body having a longitudinally extending endless conveyor having a rear end and operable for conveying the material contents of the dump body receptacle rearwardly for being discharged off the rear end of the conveyor, and a spreader mounted on the truck for spreading the material contents of the dump body receptacle discharged off the rear end of the conveyor, the improvement wherein the dump body has a bottom structure, providing the generally flat bottom of the dump body receptacle, with the longitudinally extending conveyor structurally integrated therein to form part of the flat bottom of the dump body receptacle, wherein the tailgate has an inner wall with a forwardly projecting hood between the sidewalls having a conveyor door opening aligned with the conveyor forwardly of the remaining inner wall of the

tailgate and the rear end of the conveyor, and a conveyor door, mounted on the tailgate, adjustable between a lower closed position thereof closing the conveyor opening and an upper fully open position thereof, wherein the rear end of the conveyor does not extend rearwardly as far as the remaining generally flat bottom of the dump body receptacle, and wherein the spreader is mounted on the truck frame at the rear end thereof and comprises shiftable mounting means for shifting the spreader between a rear spreader position thereof below the rear end of the conveyor for use of the truck in a spreader mode of operation and a forward retracted position thereof forwardly of the tailgate opening and free of the dump body for use of the truck in a dump mode of operation.

4,886,215

HAND OPERATED POWDER SPRAY PISTOL

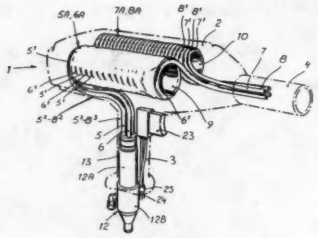
Jan Ruud, Hjälteby, Sweden, assignor to Nordson Corporation, Westlake, Ohio

Continuation of Ser. No. 67,302, Jun. 17, 1987, abandoned. This application Mar. 14, 1989, Ser. No. 323,076

Claims priority, application Sweden, Oct. 18, 1985, 8504893

Int. Cl.[4] B05B *5/00, 7/02*

U.S. Cl. 239—690.1 **13 Claims**



1. A hand held powder spray gun comprising:
a casing;
a nozzle mounted at one end of said casing;
a handle depending from said casing;
at least two charging ducts mounted within said casing, said charging ducts having a first end in communication with said nozzle and a second end;
a diffusor, said diffusor being in communication with said second end of charging ducts; and;
said diffusor being mounted within said handle.

4,886,216

MILL FOR PULVERIZING ROCK AND OTHER MATERIAL

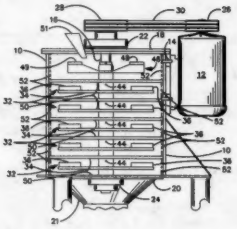
Ralph W. Goble, 21 Abernathy Ct., Highlands Ranch, Colo. 80126

Filed Mar. 8, 1988, Ser. No. 165,499

Int. Cl.[4] B02C *19/00*

U.S. Cl. 241—152 R **28 Claims**

1. A mill for pulverizing rock and other material comprising:
a hollow container having a substantially cylindrical interior surface, said container having a top longitudinal end and a bottom longitudinal end and having a central longitudinal axis;
a rotatable axle extending into said container substantially coextensive with said central longitudinal axis;
a rotor including a substantially circular, flat plate and a plurality of blades mounted about the outer periphery of said plate, said rotor mounted centrally on said axle and adapted for concurrent rotation therewith;
at least two substantially circular baffles, each baffle possessing a central aperture, the outside diameter of each said baffle being substantially equal to the inside diameter of said container interior surface and the central aperture of each said baffle being larger than the diameter of said axle, said axle extending through said central aperture of each said baffle, said rotor being disposed between said baffles, said rotor and said baffles being oriented substantially perpendicular to said central longitudinal axis;
a ring adapted to surround said rotor in a spaced relation from said rotor, the inner surface of said ring provided with a plurality of interconnected substantially flat faces,



each face substantially coplanar with the chord of a circle whose center substantially coincides with said central longitudinal axis, whereby rock or other material may pass between the inner periphery of a top-most baffle and said axle, between said top-most baffle and said rotor, between the outer periphery of said rotor and said ring, between said rotor and a bottom-most baffle, and between the inner periphery of said bottom-most baffle and said axle.

4,886,217

JAW CRUSHER

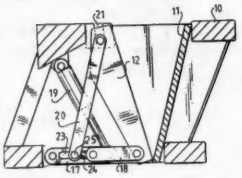
Anne van der Wal, No. 7, Harddraversweg, NL-8501 CG Joure, Netherlands

Filed Jun. 13, 1988, Ser. No. 205,865

Claims priority, application Netherlands, Jun. 23, 1987, 8701465

Int. Cl.[4] B02C *1/02*

U.S. Cl. 241—219 **13 Claims**

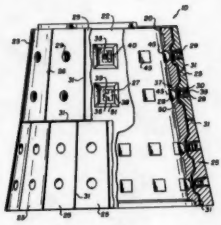


1. A crusher device comprising in combination, a frame, first and second spaced, generally vertically disposed crusher jaws supported by said frame, said first and second jaws having upper portions with upper ends that define therebetween an inlet for material to be crushed and lower portions with lower ends that define therebetween an outlet for crushed material, said second jaw being supported by the frame for reciprocating movement in a first direction toward and away from said first jaw, drive means for reciprocating said second jaw, and means for causing movement of said second jaw in a second direction transverse to said first direction while moving the lower portion of said second jaw a substantially greater distance in said first direction than the upper portion of said second jaw.

4,886,218
MANTLE WITH REPLACEABLE WEAR PLATES

Norman F. Bradley, Burnaby, and Craig H. Chamberlain, Vancouver, both of Canada, assignors to CAE Machinery Ltd., Vancouver, Canada

Filed Dec. 21, 1988, Ser. No. 287,728
Int. Cl.[4] B02C 7/12
U.S. Cl. 241—294 12 Claims



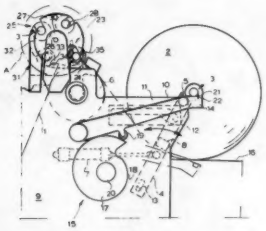
1. A mantle for use with a rock crushing apparatus comprising:
- an essentially tubular mantle body having side walls defining an exterior surface and a hollow interior being adapted to fit over the main shaft of a rock crushing apparatus;
- wear plates for attachment to the exterior of said mantle body;
- an adhesive filling material disposed between said wear plates and said mantle body; and
- locating means to allow said wear plates to be removably located on said mantle comprising
- a plurality of fasteners, each fastener having a head and threaded shaft;
- a plurality of cavities formed in the side walls of said mantle body opening onto the exterior surface of said mantle body, each cavity having locking means and being adapted to removably receive one of said fasteners such that said threaded shaft protrudes outwardly from the exterior of the mantle body side walls;
- bores formed in said wear plates to accept said threaded shafts; and
- retaining means to locate said wear plates on said threaded shafts against the exterior of said mantle body side walls.

4,886,219
WINDING UP A FOIL WEB, PARTICULARLY A FOIL WEB OF SYNTHETIC MATERIAL

Norbert Achterwinter, Hilden, and Wolfgang Hax, St. Augustin, both of Fed. Rep. of Germany, assignors to Reifenhauser GmbH & Co. Maschinenfabrik, Troisdorf, Fed. Rep. of Germany

Filed Jul. 5, 1988, Ser. No. 215,018
Claims priority, application Fed. Rep. of Germany, Jul. 3, 1987, 3721968
Int. Cl.[4] B65H 19/20, 19/26
U.S. Cl. 242—58.6 1 Claim

1. An apparatus for winding a foil web of synthetic material on a roll core, comprising:
- a winding-core magazine having a pair of disks rotatable about a magazine axis and formed with core-receiving pockets, said winding-core magazine entraining successive roll cores along a circular path;
- a pair of generally L-shaped guide elements respectively extending along peripheries of said disks, each of said guide elements having along a substantially vertical leg of a respective L, an arcuate portion extending downwardly along said circular path for guiding said cores as said cores are entrained along said path by said disks, a trough at a lower end of each arcuate portion for receiving successive cores from said pockets, and, along a generally horizontal leg of the L, an inclined edge directed downwardly away from said trough;
- a contact roller rotatable about a contact-roller axis parallel to said magazine axis, toward which said inclined edges are directed and over which said web is guided for applying a severed end of said web to a core displaced toward said contact roller;
- a pair of core-transfer arms swingable about said contact-roller axis for engagement with opposite ends of a roll core in said troughs and displacing an engaged roll core together with said disks along said inclined edges, over said contact roller and to a pickup location beyond an apex of said contact roller;

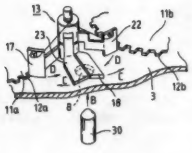


- a pair of swingable roll-winding arms receiving said ends of a roll core at said location from said core-transfer arms and provided with drive means of rotating a roll core on said swingable roll-winding arms to wind said web into a roll on a core on said swingable roll-winding arms;
- an actuating piston-and-cylinder arrangement operatively connected with said swingable roll-winding arms for displacing said ends of said swingable roll-winding arms toward and away from said contact roller and controlling a contact pressure of said contact roller with a roll wound on a core held by the ends of said swingable roll-winding arms.

4,886,220
MAGNETIC TAPE CASSETTE

Kengo Oishi, Kanagawa, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Sep. 21, 1988, Ser. No. 247,142
Claims priority, application Japan, Sep. 21, 1987, 62-234954
Int. Cl.[4] G11B 15/08, 23/087
U.S. Cl. 242—188 6 Claims



1. A magnetic tape cassette system comprising: a cassette body, a tape being pulled out of said cassette body to perform recording or playback; a pair of tape winding bodies on which said magnetic tape is wound rotatable mounted in said cassette body; a brake for both said winding bodies; and an insert movable into said cassette for detecting an end of said tape through the use of light, said insert being alternately engaged with said winding body brake for preventing rotation of both said winding bodies and moved to a position so that said brake is disabled,

wherein said cassette body has left and right sides containing

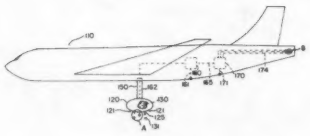
first and second apertures therein, respectively, said insert having a light source positioned and adapted for emitting a first beam of light through said first aperture and a second beam of light through said second aperture, said first and second beams being emitted in substantially opposite directions for detecting the end of said tape at either of first and second positions along said tape with respect to a direction of movement of said tape, said first and second positions being located along respective paths of said first and second beams.

4,886,221

CHARGE CONTROL APPARATUS FOR HOVERCRAFT, SPACECRAFT AND THE LIKE

Richard F. Honigsbaum, A-21 Barry Gardens, 245 Passaic Ave., Passaic, N.J. 07055

Filed Dec. 24, 1987, Ser. No. 138,505
Int. Cl.[4] B64D *45/02*
U.S. Cl. 244—1 A 10 Claims



1. A charge control apparatus for adjusting the potential of a first electrically isolated conducting body to that of a portion of its surroundings, comprising;

a second electrically conducting body mechanically connectible to said first body in electrical isolation therefrom, said second body being positioned with its portion distal with respect to said first body proximal to said portion of said surroundings;

means for inherently removing charge from said distal portion of said second body to adjust the potential of said second body to the potential of said portion of said surroundings;

means for sensing the potential difference between said first and said second bodies; and

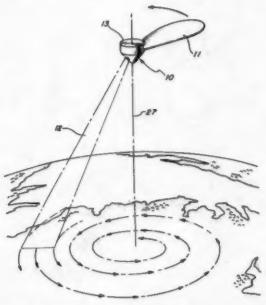
means for driving the potential of said first body toward that of said second body.

4,886,222

ATMOSPHERIC AUTOROTATING IMAGING DEVICE

James D. Burke, Sierra Madre, Calif., assignor to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.

Filed Jun. 13, 1988, Ser. No. 205,899
Int. Cl.[4] B64D *1/00*
U.S. Cl. 244—1 R 9 Claims



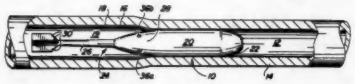
2. The imaging device of claim 1 further comprising data generation means located in said housing for generating data representative of the image detected by the image detection means.

4,886,223

PROJECTILE WITH SPIN CHAMBERS

Robert F. Gartner, Eden Prairie, Minn., assignor to Honeywell Inc., Minneapolis, Minn.

Filed May 31, 1988, Ser. No. 200,228
Int. Cl.[4] F42B *15/047*
U.S. Cl. 244—3.23 7 Claims



1. A projectile (10) for firing from a smooth bore gun tube (14), the projectile (10) comprising:

(a) a generally cylindrical warhead (20) having a predetermined outer diameter approximately equal to the diameter of the bore (12) of the gun tube (14);

(b) a nose portion (22) formed forwardly of said warhead (20); and

(c) a tail section (24) formed rearwardly of said warhead (20), said tail section (24) including

I. an elongated, slightly tapered boom (26) formed rearwardly of said warhead (20), said boom having a maximum outer diameter substantially less than the outer diameter of said warhead (20),

II. a plurality of stabilizing fins (30) mounted on the rear of said elongated boom (26),

III. a boat tail (28), said boat tail (28) having a tapered outer surface providing a gradual transition region between said boom (26) and said warhead (20) and defining a thrust area upon which the propulsive gas created by the combustion of a propelling charge in the smooth bore gun tube acts to propel said projectile (10) out of the gun tube (14),

IV. a plurality of transversely extending spin chambers (34 *a,b,c,d*) formed in the interior of said boat tail (28), and

V. a plurality of transversely extending converging-diverging nozzles (36 *a,b,c,d*), each of said nozzles (36

a,b,c,d) being in communication with a different one of said spin chambers (**34**) and extending

through said outer surface of said boat tail (**28**) to provide free access to the surrounding atmosphere when said nozzles are clear of the gun tube;

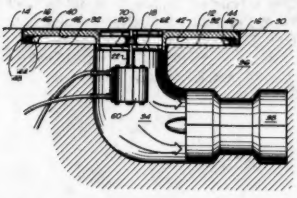
whereby a portion of the high pressure hot gas created by the combustion of a propelling charge in the smooth bore gum tube (**14**) is stored in said spin chambers (**34** *a,b,c,d*) until said spin nozzles (**36** *a,b,c,d*) are clear of said gun tube (**14**), whereupon most of said portion of said gas escapes through said converging- diverging nozzles (**36** *a,b,c,d*) whereby the escaping gas produces a torque causing said projectile to spin substantially immediately about its longitudinal axis.

4,886,224

AIRCRAFT LIFT MECHANISM

Mario G. Joy, Apdo. Postal 21-005, 04000, Mexico, D.F., Mexico

Filed Sep. 15, 1988, Ser. No. 244,414
Int. Cl.[4] B64C *29/00*
U.S. Cl. 244—23 R **21 Claims**



1. An apparatus for producing lift for a flying vehicle comprising:

a top deck of a flying vehicle having a cylindrical well formed thereinto;

a discoidal member positioned within said cylindrical well, said discoidal member adapted and powered for rotating within said well;

air intake means formed in the center of said discoidal member, said air intake means for drawing air through said discoidal member for use elsewhere in said flying vehicle; and

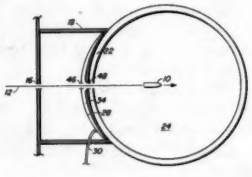
a labyrinth member formed on the periphery of said discoidal member for restricting the clearance between said discoidal member and the wall of said cylindrical well.

4,886,225

INFLATABLE FUEL TANK BUFFER

Jack R. Bates, Ridgecrest, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Jun. 6, 1983, Ser. No. 501,667
Int. Cl.[4] B64D *37/32*
U.S. Cl. 244—135 R **1 Claim**



1. In an aircraft having a fuel tank having an inner wall and adapted for containing liquid fuel, an engine air inlet duct juxtapositioned to the inner wall of said tank, and a buffer, the improvement comprising:

an inflatable bladder disposed within the tank, said bladder having one side in contact with the fuel and an opposite side in contact with the inner wall of said tank adjacent said duct; and

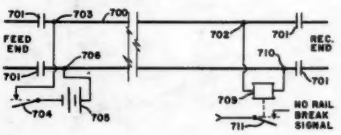
regulated gas source means connected to said inflatable bladder for extending said inflatable bladder with gas at a predetermined pressure from a collapsed minimum volume to a larger inflated volume so as to separate the fuel from said inner wall by a predetermined gas space when a predetermined amount of liquid fuel has been expended, such that the fluid dynamic ram effect damage and consequent influx of liquid fuel into said intake duct through projectile holes is minimized.

4,886,226

BROKEN RAIL AND/OR BROKEN RAIL JOINT BAR DETECTION

Klaus H. Frielinghaus, Rochester, N.Y., assignor to General Signal Corporation, Stamford, Conn.

Filed Jun. 23, 1988, Ser. No. 211,524
Int. Cl.[4] B61L *23/04;* **B64B** *1/06*
U.S. Cl. 246—121 **44 Claims**



14. A broken rail detection system that detects breaks in rails lying on an earth ground and, when said rails are connected by rail joints, in the rail joints of a track section, said track section having insulating joints at a receive end of said track section and insulating joints at a feed end of said track section which are at opposite ends of said section, said system also having a source of electrical power which system comprises:

a. means for initiating a break check and then connecting said source of electrical power across said rails at the feed end of said track to transmit current along said rails;

b. detection relay means coupled to said track across said rails and responsive to the current flowing between said rails and from any one of said rails to said ground by detecting an unbalanced ground current, whether or not a train is present on said track section; and

c. means for displaying a break, said displaying means having means coupled to said detection relay means so that, when said track does not have a break said current is sufficient to energize said detection relay means and when there is a break said current is insufficient to energize said detection relay means.

4,886,227

INDICATING INSTRUMENT

Helmut Matl, Gross Umstadt, Fed. Rep. of Germany, assignor to VDO Adolf Schindling AG, Frankfurt am Main, Fed. Rep. of Germany

Filed Apr. 20, 1989, Ser. No. 341,146
Claims priority, application Fed. Rep. of Germany, Aug. 26, 1988, 3828910
Int. Cl.[4] G12B *9/00*
U.S. Cl. 248—27.1 **7 Claims**

1. An indicating instrument comprising

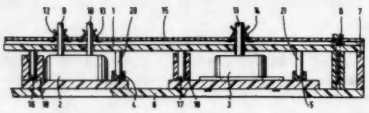
at least one measuring element;

a circuit board;

a base plate and a front plate between which said at least one measuring element is fastened, the measuring element having contact pins to be passed through the base plate for

contacting the circuit board, the circuit board extending behind the base plate;

at least one compression spring; and wherein



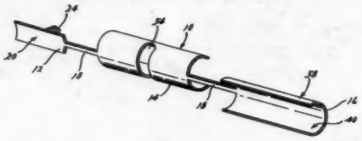
the measuring element is held by the base plate and said at least one compression spring, said at least one compression spring allowing transverse displacement of the measuring element along the base plate and clamping the measuring element against the front plate.

4,886,228

ADJUSTABLE MOUNTING BRACKET

Robert D. Kennedy, Northville, Mich., assignor to Ford Motor Company, Dearborn, Mich.

Filed Sep. 9, 1988, Ser. No. 242,101
Int. Cl.[4] F16L *3/08*
U.S. Cl. 248—74.1 **11 Claims**



1. A bracket for adjustably mounting an elongated flexible conduit to a panel comprising:

a elongated locating member,

an elongated adjusting member hingedly connected to the locating member and foldable with respect thereto into a position intermediate the locating member and the panel, slidably movable with respect thereto, having surfaces formed thereon for receiving a portion of the conduit in partially surrounding relationship and including a through aperture; and

attaching means carried with the locating member and extending through the adjusting member aperture into mounting engagement with the panel.

4,886,229

HUNTING SEAT

Roberto Aripze-Gilmore, C.P. 66290, Garza Garcia, N.L., Mexico

Filed Aug. 29, 1988, Ser. No. 238,000
Claims priority, application Mexico, Sep. 7, 1987, 8124
Int. Cl.[4] F16M *11/38*
U.S. Cl. 248—125 **7 Claims**

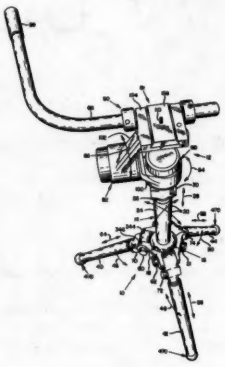
1. A foldable hunting seat comprising: two pairs of legs supporting respective first and second fastening edges, articulately coupled to each other and a seat grasped to the fastening edges, so as to be folded, a weapon support arm having a lower horizontal portion articulately coupled to the first of the fastening edges of the foldable seat, so as to be folded when the seat is folded, an upper vertical portion having a receptacle therein, a weapon holding rest comprising a fork provided with a lower vertical member to be rotatively coupled to the receptacle to the upper portion of the weapon support arm in a manner which allows to adjust its height, and two upper branches each of which having a horizontal member and a cot of flexible material fastened therebetween, to support and allow horizontal rotation of a weapon when stalk-hunting game, and a foldable fastening linkage having two ends, one end coupled to a leg of said foldable hunting seat and a second end coupled to the vertical portion of said weapon support arm, so as to retain the weapon support arm in a rigid position when stalk-hunting game and to be folded when the seat and the arm are folded.

4,886,230

CAMERA AND OTHER INSTRUMENT SUPPORT STAND

John A. Jones, Gresham; L. Mark Marchus, and Loren S. Hardy, both of Portland, all of Oreg., assignors to Cineonix, Inc., Portland, Oreg.

Filed Nov. 3, 1986, Ser. No. 926,897
Int. Cl.[4] F16M *11/38*
U.S. Cl. 248—170 **35 Claims**



1. A tripod comprising:

a body with a lower hip;

three legs arranged in tripod fashion, the legs having upper ends which are adjustably mounted to the hip so as to project from the hip in various directions to stably support the body;

leg position locking means for selectively locking the legs against movement relative to the hip;

the body including an elongated upright shaft having a lower end mounted to the hip for universal tilting movement on said hip within limits;

hip locking means for selectively locking the shaft against tilting movement relative to the hip;

the legs being adjustable as to length;

means for releasably holding the legs in adjustment; the leg position locking means comprising means for independently locking each of the legs against movement relative to the hip; and

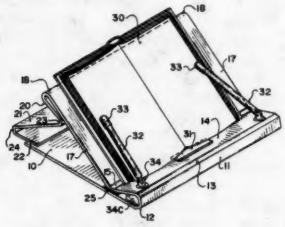
the leg position locking means comprising hydraulic leg position locking means for locking the respective legs in any position of adjustment relative to the hip.

4,886,231

FOLDABLE BOOKSTAND

Bradley L. J. Doerksen, 402 Whitegates Crescent, Winnipeg, Manitoba, Canada (R3K 1L8)

Continuation of Ser. No. 66,066, Jun. 24, 1987, abandoned. This application Dec. 27, 1988, Ser. No. 289,800
Int. Cl.[4] A47B 97/08
U.S. Cl. 248—455 9 Claims



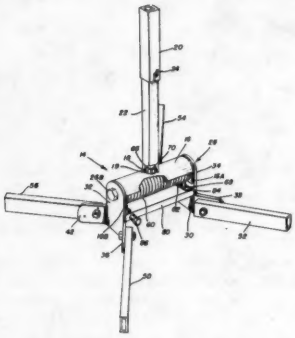
1. A foldable stand for receiving and supporting books comprising a single sheet of substantially rigid board material having a plurality of transverse hinge lines thereon defining, in an errected condition thereof, a base panel, an upstanding front panel connected to said base panel at a front edge thereof, an inclined edge receiving panel, for receiving and supporting an edge of a book, connected to said front panel at an upper edge thereof and inclined downwardly therefrom to a lower rear edge of said edge receiving panel which contacts said base panel at an intermediate position thereon, means for connecting said lower rear edge of said edge receiving panel to said base panel, a face receiving panel hingedly connected to said edge receiving panel at said lower rear edge for receiving and supporting a rear face of said book, and a support panel section hingedly connected to said face receiving panel at an upper edge of said face receiving panel for engaging said base panel to retain said face receiving panel at adjustably inclined orientations relative to said base panel, said support panel section including a first panel part hingedly connected to said upper edge of said face receiving panel, a second panel part hingedly connected by a first transverse hinge line to a lower edge of said first panel part, and a third panel part hingedly connected to a lower edge of said second panel part by a second transverse hinge line, said first transverse hinge line being shaped to allow pivotal movement of the second panel part relative to the first panel part to both sides of a position in which the parts are coplanar so as to allow movement of the support panel section from a first position in which the first panel part lies along side the face receiving panel, in which said second panel part extends outwardly from the face receiving panel to support the face receiving panel at a first angle to the base panel and in which the third panel part lies along side the base panel, to a second position in which the first panel part extends outwardly from the face receiving panel and the second panel part extends along side the base panel in a direction underneath said face receiving panel to support the face receiving panel at a second lower angle to the base panel, first fastening means which is releasable and refastenable on an inner face of the first panel part for connecting the first panel part to the undersurface of the face receiving panel, second fastening means which is releasable and refastenable on an outer face of the second panel part for connecting said second panel part to an upper surface of the base panel in said second position, and third fastening means which is releasable and refastenable on an outer surface of the third panel part for connecting the third panel part to an upper surface of the base panel in said first position.

4,886,232

DEFLECTABLE MOUNTING FOR UPRIGHT MAST

Grant D. Dicke, 1130 Franklin St., Downers Grove, Ill. 60515, and Jeffrey A. Williams, 610 Preston St., Bolingbrook, Ill. 60439

Filed Jan. 2, 1986, Ser. No. 815,737
Int. Cl.[4] F16M 13/00
U.S. Cl. 248—576 19 Claims



1. An improved deflectable mounting for an upright mast, the mounting comprising:

(a) a mast affixed substantially perpendicularly to a supporting means;

(b) a mounting base for supporting the supporting means and the mast;

(c) a pivotable means connected to the mounting base and supporting means for deflecting the mast and supporting means in two opposite directions;

(d) a first resilient means, mounted about the pivotable means, for resisting deflection of the mast and supporting means principally in a first direction;

(e) a second resilient means, mounted about the pivotable means, for resisting deflection of the mast and supporting means principally in a second direction; and

(f) an adjustable mounting means for adjustably securing the first and second resilient means to the mounting base and the mast and/or the supporting means so that the mast may be adjusted to a certain position against a deflecting force, wherein the adjustable mounting means provides a disconnection between the first and second resilient means during a portion of deflection in a direction opposite to the respective principal direction.

4,886,233

FIRE FIGHTING VENTILATION SYSTEM

Donald E. Bateman, 2-747 42nd St., and Barry L. Panter, 2-2985 North 4200 West, both of Ogden, Utah 84044

Filed Dec. 30, 1987, Ser. No. 139,777
Int. Cl.[4] F16M 13/00
U.S. Cl. 248—647 27 Claims

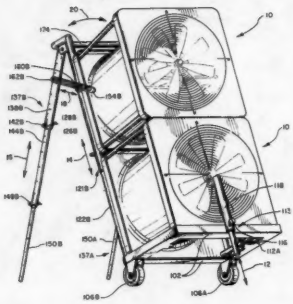
1. An apparatus for supporting and transporting fire fighting ventilation equipment which is readily deployable on uneven surfaces comprising:

a fan support frame adapted to receive and hold a fire ventilation fan;

two wheels attached to the support frame;

first, second, and third extensibly adjustable means for supporting the fan support frame, each said means comprising a means for extending the length thereof independent of one another, and each said adjustable support means being spaced one from another thereby forming a tripod to enhance stable placement of the fan support frame on uneven surfaces without the need for support by said

wheels, at least one of said extensibly adjustable support means providing stabilizing support on the front of said fan support frame to assist in retaining the ventilation fan on the fan support frame; and



first and second angularly adjustable means provided on at least two of said extensibly adjustable support means for independently adjusting and maintaining a desired angular distance between the at least two of said extensibly adjustable support means and the fan support frame.

4,886,234

SHUTTERING APPARATUS

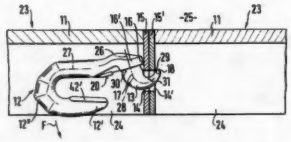
Artur Schwörer, Wullenstetten, and Hans Braun, Memmingen, both of Fed. Rep. of Germany, assignors to Peri-Werk Artur Schworer GmbH & Co. KG, Weissenhorn, Fed. Rep. of Germany

Filed Nov. 22, 1988, Ser. No. 274,585

Claims priority, application Fed. Rep. of Germany, Nov. 23, 1987, 3739633

Int. Cl.[4] E04C *1/10*

U.S. Cl. 249—196 **19 Claims**



1. Shuttering apparatus having at least two shuttering panels which respectively comprise a shuttering skin and reinforcement strips which are disposed at at least some of the edges of the shuttering panels, which project substantially perpendicular to their rear sides and which have a plurality of connection bores; and at least one connection member for two adjacent shuttering panels, with the connection member having a spigot part which can be passed through two mutually aligned bores of two directly contacting reinforcement strips and a hook part which branches off from one end of the spigot part, and which can be brought, when the spigot part is inserted, by pivoting of the hook part into engagement with a said reinforcement strip which faces away from a connection plane between the spigot and the hook part, wherein the spigot part (17) only has a length substantially the same as a thickness of the two reinforcement strips (15, 15') through which it passes, is restrictedly pivotable about an axis perpendicular to a plane formed by its central longitudinal axis (26) and that (27) of the hook part (12), and also passes at an end remote from the connection plane (30) with the hook part (12) into a crooked lever arm (13) which is remote from the hook part (12) and of smaller cross-section than the bores (14, 14'), with the lever arm being insertable through the two substantially aligned bores (14, 14') from one side of one of the reinforcement strips (15) until the spigot part (17) is located inside the bores (14, 14') and an outer end surface (18) of the lever arm (13) remote from the hook part (12) contacts the other reinforcement strip (15'); wherein the hook part (12) has a support surface (20) at a side of the spigot remote from the lever arm (13) and facing opposite to the reinforcement strip (15) provided at the connection plane (30) with the support surface (20) coming into contact in the installed state with the reinforcement strip (15) disposed at the connection plane (30) when the spigot part (17) is inserted into the bores (14, 14'); and wherein when an engagement end (12') of the hook part (12) is in engagement with the associated reinforcement strip (15') the support surface (20) is clamped against the contacting reinforcement strip (15) on a side opposite to the engagement end (12'), and the end surface (15') of the lever arm (13) is clamped against the contacting reinforcement strips (15) from a same side as the engagement end (12').

4,886,235

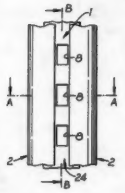
DISPLAY POST

John W. T. K. Thornborrow, Tudor Lodge, Duffield Road, Sonning, Berkshire, England

Continuation of Ser. No. 226,205, Jul. 29, 1988, abandoned, which is a continuation-in-part of Ser. No. 85,900, Aug. 14, 1987, abandoned. This application Feb. 3, 1989, Ser. No. 306,218

Int. Cl.[4] E04G *5/06*; A47G *29/02*

U.S. Cl. 248—225.1 **12 Claims**



1. A display post comprising a hollow elongate support member of rectangular cross-section with opposed narrower sides each having a series of spaced slots therein extending along the length thereof and opposed wider sides, a pair of cover members, and means removably mounting the cover members on said support members, each cover member being adapted to cover a wider side of the support member, the cover members being spaced apart in the region of said slots to expose at least that part of each narrower side of the support member containing said slots, said means removably mounting the cover members comprising a series of studs upstanding from each wider side of the support member and spaced along the length thereof, a plastics button having an enlarged head mounted on each said stud and a T-section slot in the rear surface of each cover member slidably engageable with said plastics buttons.

4,886,236

SUPPORT FOR SECURING A SHELF TO A WALL

Harold M. Randall, Fullerton, Calif., assignor to Newell Operating Co., Memphis, Tenn.

Continuation-in-part of Ser. No. 217,415, Jul. 11, 1988. This application Feb. 2, 1989, Ser. No. 305,285

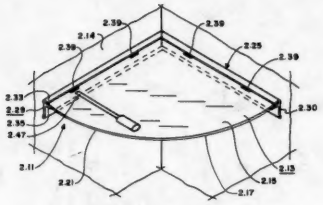
Int. Cl.[4] A47G *29/02*

U.S. Cl. 248—250 **1 Claim**

1. In combination with a shelf and a wall, support means for securing said shelf to said wall, said shelf having a top surface, a bottom surface, a rear wall, and a front wall; said support means comprising:

(a) a one-piece, integral bracket means for being secured to

said wall, said bracket including a body member having a rear side for being held against said wall; said bracket means including an upper arm member attached to said body member for extending outwardly from said wall, said upper arm member having a lower surface; said bracket means including a lower arm member attached to said body member at a spaced distance below said upper arm member for extending outwardly from said wall, said lower arm member having an upper surface; the space between said lower surface of said upper arm member and said upper surface of said lower arm member forming an elongated throat for receiving said rear wall of said shelf; and



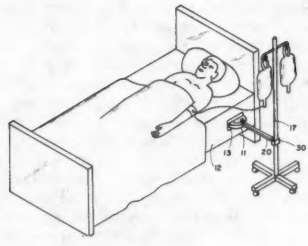
(b) wedge means for being inserted between said top surface of said shelf and said lower surface of said upper arm member of said bracket means after said bracket means has been secured to said wall and after said rear wall of said shelf has been received by said throat of said bracket means to fix said shelf to said bracket means; said wedge means including a plurality of resilient wedge members for being forced between said top surface of said shelf and said lower surface of said upper arm member of said bracket means; each wedge member having a substantially pointed, narrow forward end and a rear end that is relatively wide as compared to the forward end, said rear end of each wedge member has a groove there across, and said bracket means is bent at an angle to be attached to said wall at a corner.

4,886,237

UNIVERSAL ARTICULATABLE SUPPORT FOR RETAINING INTRAVENOUS STANDS IN MEDICAL APPLICATIONS

Robert R. Dennis, 4402 MacWorth Pl., Baltimore, Md. 21236

Filed Sep. 23, 1988, Ser. No. 248,146
Int. Cl.[4] A47F *5/00*
U.S. Cl. 248—289.1 **14 Claims**



1. A device for attaching a column of an intravenous stand to a frame means of a patient support apparatus or the like comprising:

a bracket means attached to the frame means of the patient support apparaus such that the bracket means extends outwardly and substantially horizontally;

a bar having a first end and a second end;

means for mounting the first end of the bar to the bracket means, such that the bar may be folded substantially flat against the frame of the patient support apparatus in a storage position when not in use, and such that the bar may be extended in a horizontal plane about a verical axis to a least a first position outwardly therefrom when in use to accommodate needs and available space; and

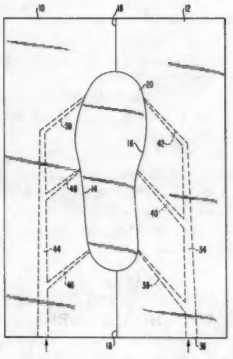
means for releasably clamping the second end of the bar to the column of the intravenous stand, thereby rigidly and removably supporting the intravenous stand in a substantially vertical position at all times at a desired position with respect to the patient support apparatus and preventing inadvertent movement of the intravenous stand during use thereof.

4,886,238

APPARATUS FOR MOLDING FOOTWEAR

John M. Davis, Avenida Universidad, Apt. 3B, Ponce, P.R. 00731

Filed Feb. 25, 1988, Ser. No. 160,300
Int. Cl.[4] A43D *65/00*
U.S. Cl. 249—83 **4 Claims**



1. In a mold for molding a midsole of molten flexible plastics material to a preformed outsole and an upper comprising a pair of side mold members each having a vertical wall defining one-half of a midsole mold cavity on the respective opposite sides of a parting line which, when the mold is closed conforms substantially to the longitudinal axis of said midsole, the vertical walls of said side mold members when the latter abut each other along said parting line defining a peripherally closed ring mold cavity open at its top and bottom, a sole plate for closing the bottom of said cavity and a last for closing the top of said cavity; means for substantially simultaneously moving said side mold halves from a spaced apart position into an abutting position along said parting line, said sole plate with a preformed outsole thereon into a position closing the bottom of said ring mold cavity, and said last with an upper releasably fixed thereto into a position vertically spaced from said preformed outsole and closing the top of said ring mold cavity with the lower edge of said upper projecting into said ring mold cavity; the improvement comprising means for conveying injected molten plastics material into said ring mold cavity between said last and said sole plate comprising a main gating channel formed entirely within one of said mold halves and extending substantially parallel to said parting line along a substantial length of said mold cavity with one end of said channel opening to the exterior of said mold half for the reception of injected molten plastics material, and branch runner

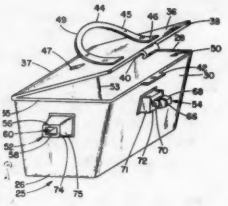
channel means also formed entirely within said one mold half and interconnecting said main gating channel with the vertical wall of said mold half.

4,886,239

ICE CUBE MAKER

Stephanie J. Stimmel, 14 Feller Dr., Central Islip, N.Y. 11722

Filed Sep. 16, 1987, Ser. No. 97,126
Int. Cl.[4] F25C *1/24*
U.S. Cl. 249—117 8 Claims



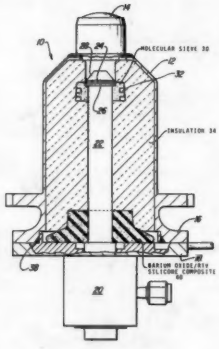
1. An ice cube molding container, comprising:
an inverted, truncated pyramidal shaped body having closed opposing side walls, closed bottom wall, and an open top;
a cover hinged to one of said side walls to close said open top;
catch means disengageably holding said cover closed in leakproof abutment with said open top;
handle means on said cover to facilitate opening said cover;
said body having a conical internal cavity for forming a conical ice cube therein; and
quick attachment and detachment means on said side walls to enable quick mutual lateral attachment of a multiplicity of said ice molding containers to each other to form a planar array, and to enable individual quick detachment of each of said containers from said array.

4,886,240

DEWAR CRYOPUMPING USING BARIUM OXIDE COMPOSITE FOR MOISTURE REMOVAL

Benjamin K. Rich, Santa Barbara, Calif., assignor to Santa Barbara Research Center, Goleta, Calif.

Filed Oct. 20, 1988, Ser. No. 260,168
Int. Cl.[4] G01J *5/06*
U.S. Cl. 250—352 12 Claims



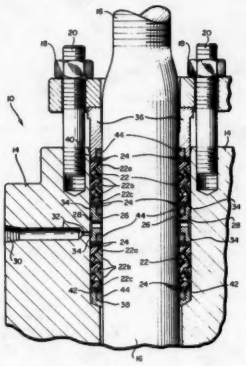
1. In a dewar having a housing and a detector mounted to the tip of a coldfinger for cooling the detector during operation thereof, the improvement comprising:
a molecular sieve mounted to the coldfinger adjacent the detector; and
desiccant means in the housing for irreversibly adsorbing moisture therein.

4,886,241

VALVE STEM PACKING CONTAINMENT FOR HIGH PRESSURE, HIGH TEMPERATURE

James R. Davis, and Robert T. Wilson, both of Marshalltown, Iowa, assignors to Fisher Controls International, Inc., Clayton, Mo.

Filed Sep. 16, 1987, Ser. No. 97,617
Int. Cl.[4] F16K *41/04;* F16J *15/20, 15/40*
U.S. Cl. 251—214 6 Claims



1. A fluid valve for use in high pressure and high temperature condition around 7200 psi (506 kscm) and 450° F. (232° C.), said fluid valve comprising:
a valve body;
a valve stem movably mounted within said valve body for operating said valve;
a valve bonnet mounted to said valve body and adapted to receive said valve stem, including a packing bore within said valve bonnet to surround the outer diameter of said valve stem;
packing loading means at opposite ends of said packing bore;
a pair of synthetic resin polymer packing assemblies in said packing bore formed of TFE material for normal valve operation in environments having temperature ranges around 450° F. (232° C.) and surrounding the outer diameter of said valve stem, each of said packing assemblies including at least two packing rings each formed of a first face and an opposite second face with the respective first faces adapted for mating contact and the respective opposite second faces being planar-shaped, each of said packing assemblies disposed in said packing bore with the first faces of the packing rings facing each other at the inner portion of the packing assemblies, and the respective planar-shaped second faces of the packing rings at the opposite outer ends of the packing assemblies;
passage means for communicating the exterior of said valve body with said packing bore and said valve stem, including a lantern ring between said pair of packing assemblies;
at least one flat, substantially planar, symmetrical, anti-extrusion wiper ring surrounding said valve stem at each respective outer end of said pair of packing assemblies and between said lantern ring and each respective inner end of said pair of packing assemblies, each of said anti-extrusion wiper rings engageably contacting a respective planar-shaped second face thereof of said packing ring, said anti-extrusion wiper rings each formed of high temperature organic or inorganic fiber material with a nitrile

elastomeric binder suitable for normal valve operation in environments having temperature ranges around 450° F. (232° C.) and having an inner diameter sized to form an interference fit with the valve stem to wipe the valve stem, inhibit packing extrusion, and contain any packing extrusion between said anti-extrusion wiper rings at each respective outer end of said pair of packing members during normal valve operation; and

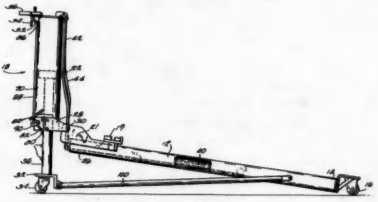
a seal element being disposed above and below each pair of said anti-extrusion wiper rings at each respective outer end of said pair of packing assembles, each of said seal elements surrounding and engageably contacting said valve stem.

4,886,242

PNEUMATIC HYDRAULIC SIDE LIFTING JACK

Leonard Eck, McPherson, Kans.; Reinald D. Liegel; Charles Naber, both of Waukesha, Wis., and Garry J. Sabel, South Milwaukee, Wis., assignors to Hein-Werner Corporation, Waukesha, Wis.

Filed Sep. 28, 1988, Ser. No. 250,772
Int. Cl.[4] B66F *3/00*
U.S. Cl. 254—8 B **31 Claims**



1. A side lifting jack for lifting a vehicle, the side lifting jack comprising:

a lift arm having opposite ends, one end of the lift arm being supported by at least one wheel, and the one end of the lift arm being adapted to extend under a vehicle,

jack means for supporting the other end of the lift arm, the jack means including a hydraulic cylinder assembly including a hydraulic cylinder and an extensible piston housed in the hydraulic cylinder, the hydraulic cylinder assembly being generally vertically extensible, one of the cylinder and the piston being connected by a pivotal connection to the other end of the lift arm for raising the other end of the lift arm in response to extension of the hydraulic cylinder, and the other of the piston and cylinder including a lower end, and an elongated brace member having opposite ends, one of the opposite ends of the elongated brace being connected to said lower end of the other of the piston and cylinder, and the other of the opposite ends of the brace member being connected to the lift arm in spaced relation from the other end of the lift arm.

4,886,243

HYDRAULIC JACK RAMP

Christopher J. Trumbull, Rte. 1, Box 191-A, Jane Lew, W. Va. 26378

Filed Oct. 26, 1988, Ser. No. 262,746
Int. Cl.[4] E02C *3/00*
U.S. Cl. 254—88 **1 Claim**

1. A hydraulic vehicular ramp jack apparatus comprising,

a jack member including a plurality of spaced frame rails housing motive means operatively secured to at least one lifting link, and

a friction means positioned at a forward end of said jack member for frictionally anchoring the forward end of said jack member, and

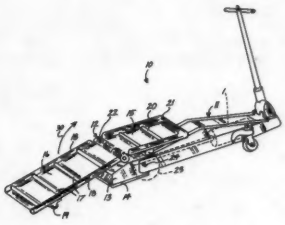
a ramp means operatively secured to said lifting link and overlying said friction means for accepting and lifting a vehicle thereon, and

wherein said ramp means includes a top ramp portion secured to said lifting link and a lower ramp portion pivotally secured to said top ramp portion, and

wherein said friction means is secured to a forward axle of said jack member wherein a plurality of wheels are selectively securable to exterior terminal ends of said axle, and

wherein said lower ramp portion includes a pair of spaced guide rails coextensively integrally formed to sides of said lower ramp portion with a plurality of traction ribs integrally secured to said lower ramp portion between said guard rails, and

wherein said top ramp portion includes a "U" shaped guard rail integrally formed to a perimeter of said top ramp



portion with a plurality of top traction ribs secured to said top ramp portion, and

wherein said top traction ribs include a plurality of parallel first ribs of a first length depending upwardly of a surface of said top ramp portion a distance substantially equaling $\frac{1}{8}$th inch and a plurality of parallel second ribs positioned exteriorly of said first ribs between said "U" shaped guard rail extending upwardly of said top ramp portion surface $\frac{1}{4}$ inch of a second length greater than the first length, and

wherein said friction means includes a foot with an axle receiving bore directed transversely of said foot with an upwardly depending channel depending from said bore for directing said axle into said axle receiving bore, and

wherein said lower ramp portion includes a plurality of rollers secured to a forward underlying surface of said lower ramp portion.

4,886,244

HYDRAULIC LIFT PERFECTED FOR THE LIFTING AND THE HANDLING OF HEAVY LOADS OF SEVERAL TONS

Jacques Renault, 16 Rue Lamothe, Lyon 7 e'me Rhône, France

Filed Jun. 21, 1988, Ser. No. 209,304
Claims priority, application France, Jun. 22, 1987, 87 09101
Int. Cl.[4] B66F *3/24*
U.S. Cl. 254—932 P **10 Claims**

1. A hydraulic jack to be used in a horizontal or vertical position comprising: a guiding column having an upper section and a lower base section, and a front section and a back section;

a first lifting surface and a second lifting surface wherein the first lifting surface is located at the upper section of the guiding column and the second lifting surface is located at the lower base section of the column;

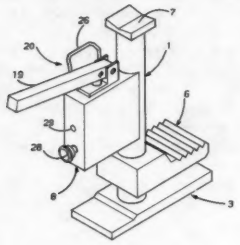
a support bed plate located at the lower base section of the guiding column and tightly fitted to the guiding column;

a jack body located on the guiding column;

a guiding screw located at the upper section of the guiding column for directing the body of the jack on the guiding column;

a hydraulic system for raising and lowering the lifting surface comprising: an intake valve which is immersed in hydraulic fluid when the jack is positioned vertically or

horizontally; a fluid reservoir operably connected to the input valve for holding fluid under pressure; and a dual



output/pressure relief valve to release fluid from the reservoir, and to release fluid in the event of a weight overload.

4,886,245

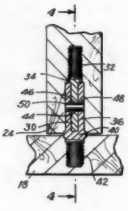
INTERLOCKING PIVOT DEVICE FOR ADJUSTABLE BALLUSTERS

Louis Manzo, 8 Putnam Ct., Holmdel, N.J. 07733

Continuation-in-part of Ser. No. 6,292, Jan. 20, 1987, abandoned, which is a continuation-in-part of Ser. No. 861,367, May 9, 1986, abandoned. This application Mar. 3, 1988, Ser. No. 168,636

Int. Cl.[4] E04H *17/14*

U.S. Cl. 256—67 **41 Claims**



1. An interlocking pivot device for pivotally connecting the end of a balluster to a hand or foot rail of a staircase assembly, comprising:

a female element mounted in said balluster end and having a slotted opening;

a male member, said slotted opening of said female element receiving and mating with said male member, said male member pivotally rotating within said female element;

first means for connecting one of said male member and said female element to said balluster;

second means for connecting the other of male member and said female element to said hand or foot rail;

wherein said female element and mated male member are received in a slot formed in said balluster end.

4,886,246

METAL-MAKING APPARATUS INVOLVING THE SMELTING REDUCTION OF METALLIC OXIDES

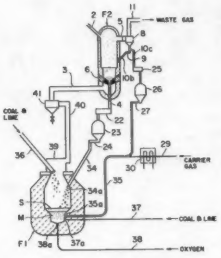
Takuya Maeda; Keikichi Murakami; Tsutomu Yamada, all of Kobe; Mitsuharu Kishimoto, Harima; Kenichi Yajima, and Yoshihiko Takemura, both of Kobe, all of Japan, assignors to Kawasaki Jukogyo Kabushiki Kaisha, Hyogo, Japan

Filed Nov. 14, 1988, Ser. No. 272,053

Claims priority, application Japan, Nov. 13, 1987, 62-288150; Nov. 13, 1987, 62-288151

Int. Cl.[4] F27B *15/00*

U.S. Cl. 266—157 **8 Claims**



1. A metal-making apparatus using a raw ore which contains a metallic oxide and which has a wide range of particle sizes, the metal-making apparatus comprising:

(a) a solid-state prereduction furnace for preliminarily reducing a raw ore in a solid state, said prereduction furnace having a distributor with a funnel-shaped or inclined top surface;

(b) raw ore supply means for charging raw ore particles of widely varying sizes into said prereduction furnace for placement on said distributor;

(c) gas supply means for blowing high temperature reducing gas up through said distributor and a charge of raw ore particles thereon for causing ore particles of a larger size to form a fluidized bed on said distributor and for prereducing ore particles of a larger size by intimate contact with a high temperature reducing gas, and for causing ore particles of smaller size to be carried out from the fluidized bed by the waste gas for being prereduced thereby;

(d) separator means for collecting the prereduced ore particles of smaller size from the waste gas;

(e) a smelting reduction furnace for smelting and finally reducing a prereduced ore in a molten state;

(f) first delivery means for delivering the prereduced ore particles of larger size from said prereduction furnace to said smelting reduction furnace, said first delivery means including means for charging the prereduced ore particles of larger size into said smelting reduction furnace by the force of gravity; and

(g) second delivery means for delivering the prereduced ore particles of smaller size from said separator means to said smelting reduction furnace, said second delivery means including means for pneumatically injecting the ore particles of smaller sizer into said smelting reduction furnace.

4,886,247

CERAMIC BRICK RETAINER BAND FOR STEEL LADLE

Donald B. Hoffman, Florissant, Mo.; Joseph J. Linhart, Granite City, and Raymond C. Stoces, Glen Carbon, both of Ill., assignors to National Steel Corporation, Pittsburgh, Pa.

Filed Nov. 8, 1988, Ser. No. 268,725

Int. Cl.[4] C21C *5/44*

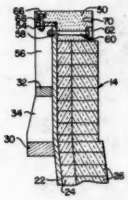
U.S. Cl. 266—246 **11 Claims**

1. In a metallurgical ladle having a bottom wall and an

upwardly extending sidewall, trunion means for supporting the ladle for tilting movement about a horizontal axis located in a vertical centerplane of the ladle, the sidewall including an outer steel shell terminating in an open top and an inner lining of refractory brick covering the inner surface of said shell, and brick retaining means on said shell and overlying the inner lining to retain the refractory brick in position when the ladle is tilted about its trunion axis for slag skimming, metal pouring or deslagging, the improvement wherein said lining brick retaining means comprises,

a plurality of separately formed retaining ring segments adapted to be mounted on the inner surface of said shell,

mounting means releasably mounting said ring segments on the inner surface of said shell adjacent said open top in



abutting end-to-end relation to one another to define a substantially continuous retaining ring, each said retaining ring segment having a bottom surface overlying a portion of said refractory brick lining to retain the brick in position and a top substantially horizontal surface extending above said open top of said shell,

said retaining ring segments being formed from a high strength heat resistant ceramic material which is resistant to attack by slag and hot metal contained in the ladle,

an outwardly extending ledge on said shell at said open top, and

at least selected ones of said segments including a portion extending outwardly above said open top and engaging said ledge.

4,886,248

RAPID EXTENSION SHOCK ABSORBER, IN PARTICULAR FOR CARRIER-BASED AIRCRAFT

Maurice Delhaye, GIF S/Yvette; Michel Derrien, Versailles, and Jean-Luc Engerand, Sceaux, all of France, assignors to Messier-Hispano-Bugatti, Montrouge, France

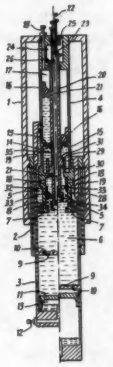
Filed Dec. 16, 1988, Ser. No. 285,425

Claims priority, application France, Dec. 18, 1987, 87 17745

Int. Cl.[4] B64C *25/26, 25/60*

U.S. Cl. 267—64.26 **9 Claims**

1. A shock absorber comprising a strut, a sliding rod mounted to slide inside the strut, means for forming at least one gas chamber under pressure, an oil chamber associated with the gas chamber, and an expansion chamber connected to the oil chamber via expansion throttling means, the volume of the expansion chamber varying as a function of the extent to which the sliding rod is received in the strut, wherein the shock absorber includes an expansion short circuit passage between the oil chamber and the expansion chamber, said expansion short circuit passage having a cross-section which is greater than the flow section of said expansion throttling means, and



wherein the shock absorber further includes controlled closure means for closing the expansion short circuit passage.

4,886,249

SPRING BANDS FOR INCORPORATION IN SPRING UNITS

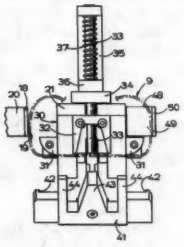
Leslie T. Docker, Nr. Kenilworth, and William Whittleworth, Stockport, both of United Kingdom, assignors to Multilastic Limited, Carthage, Mo.

PCT No. PCT/GB87/00379, § 371 Date Nov. 23, 1988, § 102(e) Date Nov. 23, 1988, PCT Pub. No. WO87/07539, PCT Pub. Date Dec. 17, 1987

PCT Filed Jun. 3, 1987, Ser. No. 278,532

Int. Cl.[4] F16F *3/04;* **B21F** *27/16*

U.S. Cl. 267—91 **10 Claims**



1. A method of making a spring band for incorporation in a spring unit, the method comprising subjecting a length of wire to an initial bending operation in which it is shaped to form both a plurality of coil springs (1) disposed side-by-side in a row, ends of the coil springs lying in or near opposed edge faces of the band, and a plurality of connectors (2) integral with the springs, each connector lying in or near an edge face of the band and serving to interconnect two adjacent springs in the row, each connector having two spaced end portions (3), which extend transversely of the band, and an intermediate portion (4), between said end portions, which extends past said two adjacent springs, the method being characterised in that subsequent to said initial bending of the length of wire, at least part of each and every connector is subjected to a further bending operation such as to cause the end portions to take up

positions in which they are spaced apart at a predetermined spacing.

4,886,250

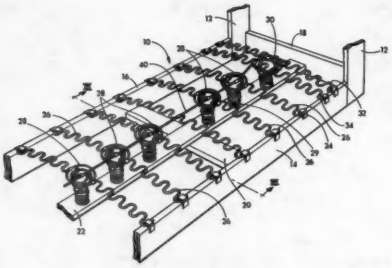
SPRING STRUCTURE FOR CUSHION SEATING

Thomas H. Lucas, Cambridge, Wis., assignor to Schweiger Industries, Inc., Jefferson, Wis.

Filed Aug. 7, 1987, Ser. No. 83,665

Int. Cl.[4] F16F *3/02*; A47C *23/053, 23/28*

U.S. Cl. 267—95 **18 Claims**



1. A spring cushion construction comprising:

(a) a frame for supporting the construction, the frame comprising a front rail, a rear rail and two opposing side rails;

(b) at least one rigid support member extending between and generally parallel to the front and rear rails within the frame, the support member having two ends, each being attached to the opposing side rails;

(c) a plurality of parallel sinuous wire springs traversing the frame between the front and rear rails in a direction generally perpendicular to the support member;

(d) a plurality of coil springs fixedly mounted at their respective lower ends to said support member and said coil springs spaced along the area of said spring cushion between said front and rear rails and intended to support the load of a seated person's weight, wherein each coil spring is attached at its upper end to at least one sinuous spring, said coil springs being held relatively fixed at their lower ends on said rigid support member during compression of said coil springs under said load for effective absorption of said load on the spring system including said coil and sinuous wire springs to provide deep resilient support to the sinuous springs and

(e) a tie wire located substantially parallel to the support member and generally overlying each of said coil springs generally in the central portion thereof, the tie wire being connected to the sinuous and coil springs.

4,886,251

HYDRAULICALLY DAMPING RUBBER BEARING ENGINE MOUNT

Gerd Häussermann, Stuttgart, Fed. Rep. of Germany, assignor to Daimler-Benz Aktiengesellschaft, Stuttgart, Fed. Rep. of Germany

Filed Feb. 7, 1989, Ser. No. 306,938

Claims priority, application Fed. Rep. of Germany, Feb. 24, 1988, 3805763

Int. Cl.[4] F16F *9/08, 13/00*; B60K *5/12*

U.S. Cl. 267—140.1 **4 Claims**

1. A hydraulically damping rubber bearing engine mount for motor vehicles, having two end walls lying opposite one another in the axial direction with a pressure and an auxiliary chamber therebetween;

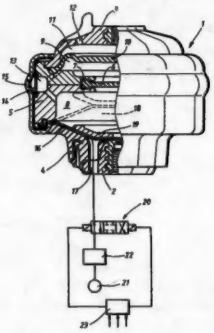
these chambers contain a damping fluid and are connected to one another by a restricted orifice;

an annular rubber-elastic spring element means coupled to the engine mount for transmitting a variable force to the engine mount and wherein said spring element means adjoins the pressure chamber and is secured on one of said walls;

a diaphragm is fluid-tightly clamped in the pressure chamber and is loaded on one side by the damping fluid and can be loaded on the other side by compressed air fed in from outside of the engine mount;

means for loading the diaphragm with a quantity of compressed air so as to form an air chamber between the diaphragm and both the spring element and said one end wall with the diaphragm lifting off from therefrom;

and wherein the means for loading the diaphragm causes the diaphragm to lift off from the spring element means and



the one end wall either partially, or totally, to provide contact areas with the spring element and the one end wall of varying sizes over varying regions depending on the size of the air chamber, and;

wherein the spring element means is fully coupled to the engine mount to transmit full force from the spring element means when the diaphragm is not lifted from the spring element means, is partially coupled to transmit a reduced force when the diaphragm is partially lifted from the spring element means and is fully decoupled to transmit no force from the spring element means when the diaphragm is fully lifted from the spring element means.

4,886,252

HYDRAULICALLY DAMPING SPRING DEVICE

Gerd Häussermann, Stuttgart, Fed. Rep. of Germany, assignor to Daimler-Benz Aktiengesellschaft, Stuttgart, Fed. Rep. of Germany

Filed Feb. 2, 1989, Ser. No. 305,194

Claims priority, application Fed. Rep. of Germany, Feb. 24, 1988, 3805761

Int. Cl.[4] B60K *5/12*; F16F *9/00, 13/00*

U.S. Cl. 267—140.1 **4 Claims**

1. A hydraulically damping rubber spring device usable as an engine mount for motor vehicles, comprising:

two end walls lying opposite one another in an axial direction of the spring device and between which are arranged two working chambers;

both working chambers are fillable with damping fluid and are separated from one another by a dividing wall in which is arranged a channel;

said channel connecting the two working chambers to one another;

the length of said channel being at least equal to the length of the dividing wall and the cross-section of the channel being small relative to its length;

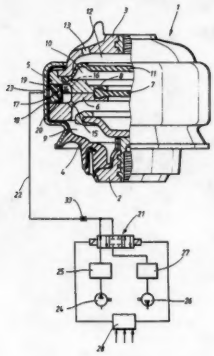
a rubber-elastic spring element adjoining one of the two working chambers and secured on one end wall;

means for varying the size of a wall area and a volume of the

channel by complete or partial isolation of a longitudinal portion of the channel from outside the spring device;

said means for varying including a rotary slide arranged in the channel and transverse to it;

rotation means to rotate the rotary slide so that a first longitudinal portion of the channel, which is open towards the second of said working chambers is, in one end position of the rotary slide, connected to another longitudinal portion of the channel, which is open towards the one working chamber;



and wherein in the other end position of the rotary slide, the first longitudinal portion of the channel is connected directly to the one working chamber, by-passing the other longitudinal portion of the channel;

and wherein between these two end positions of the rotary slide, the first longitudinal portion of the channel is connected to both the one working chamber and the other longitudinal portion of the channel with continuously varying rotary slide passage cross-sections.

4,886,253

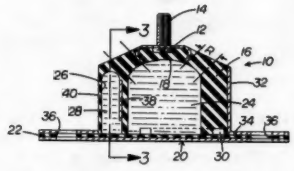
HYDRAULIC ENGINE MOUNT WITH INTEGRAL HYDRAULIC CHAMBERS AND DIAPHRAGM

Saiman Lun, Englewood, Ohio, assignor to General Motors Corporation, Detroit, Mich.

Filed Aug. 5, 1988, Ser. No. 228,420

Int. Cl.[4] F16F *9/10*

U.S. Cl. 267—140.1 **3 Claims**



1. A hydraulic mount assembly, comprising:

a mounting member;

a resilient hollow body having an integral annular wall section connected to said mounting member;

a relatively rigid retainer cylinder surrounding substantially the entire periphery of said hollow body;

base means cooperating with said hollow body to form a closed primary chamber filled with fluid;

said mounting member occupying an area of said hollow body centrally of said annular wall section that is substantially smaller in size than a corresponding cross sectional area of said primary chamber so that said annular wall section is free to flex;

a secondary chamber integral with said hollow body and adjacent said primary chamber, said secondary chamber being separated from said primary chamber by a portion of said retainer cylinder;

diaphragm means formed by an outer wall of said secondary chamber; and

fluid communication means providing damping fluid flow between said primary and secondary chambers, whereby relatively soft damping action is effected upon movement of said mounting member.

4,886,254

ELASTIC SUSPENSION BLADE PROVIDED WITH END CONNECTORS FOR A VEHICLE

Jean-Claude Carpentier, Mareil-Le-Guyon; Bernard Michel, Montigny-le-Bretonneux, and Kenneth H. Sayers, Neauple-le-Chateau, all of France, assignors to Bertin & Cie, Cedex, France

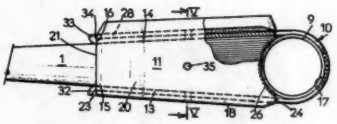
PCT No. PCT/FR87/00133, § 371 Date Dec. 23, 1987, § 102(e) Date Dec. 23, 1987, PCT Pub. No. WO87/06665, PCT Pub. Date Nov. 5, 1987

PCT Filed Apr. 22, 1987, Ser. No. 155,711

Claims priority, application France, Apr. 25, 1986, 86 06014; May 23, 1986, 86 07382

Int. Cl.[4] F16F *1/36*

U.S. Cl. 267—148 **18 Claims**



1. An elastic vehicle suspension leaf having, at its ends, terminal pieces equipped with means for connection to wheels, said leaf composed of a composite material with longitudinal fibers extending continuously from one end to the other, and having, at least at its ends, an evolute profile of approximately constant cross-section, the width of which decreases concomitantly with an increase in thickness, wherein each of the terminal pieces comprises, in combination, (a) a cylindrical ring seated in a bearing notch milled in the adjacent end of the leaf for connecting said leaf to a wheel, the ring axis being perpendicular to the bending plane of the leaf; (b) a U-shaped casing for maintaining the ring in the notch, said casing having lateral branches widened towards their free ends and applied on complementary shaped opposed sides of the leaf adjacent to a leaf end, and (c) a four-sided rigid housing defining a trapezoidal inner volume; the small bases of two opposite sides being adjacent to the large bases of two other sides, and the size of said inner volume being complementary of that of the leaf end, the lateral branches of the U-shaped casing being engaged by said housing so as to be self-blocked longitudinally on the leaf end together with the housing.

4,886,255

SUSPENSION STRUT WITH SELECTIVELY CONTROLLABLE DIFFERENTIAL REBOUND AND JOUNCE DAMPING

H. Neil Paton, 1218 Third Ave., Ste. 1018, Seattle, Wash. 98101

Filed May 27, 1987, Ser. No. 54,539

Int. Cl.[4] F16F *7/08*

U.S. Cl. 267—205 **20 Claims**

1. A frictionally damped suspension strut, comprising:

a first load bearing member;

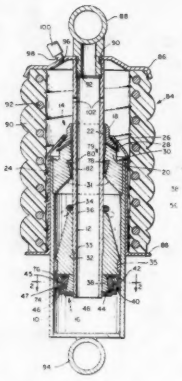
a second load bearing member telescopically movable within said first load bearing member;

a load responsive bidirectional damping assembly supported by said first load bearing member, and comprising first damping means for applying a first frictional damping force to said second load bearing member continuously during contraction of said first and second load bearing members under jounce conditions, and for applying a second frictional damping force to said second load bearing member continuously during extension of said first and second load bearing members under rebound conditions, said first and second frictional damping forces being proportional to the loads applied to said first and second load bearing members under jounce and rebound conditions, respectively; and

a velocity responsive rebound damping assembly supported by said second load bearing member, and comprising second damping means for applying a third frictional damping force to said first load bearing member essentially only in response to extension of said first and second load bearing members under rebound conditions, and then after a lost-motion interval which is (i) shorter as said extension velocity increases and (ii) longer as said extension velocity decreases,

said second damping means comprising lost-motion control means including a precompressed elastomer member which is deflectable in shear, in a direction parallel to the direction of travel of said first and second load bearing members, during said lost-motion interval, and means forming a space providing clearance along said direction of travel sufficient to permit said elastomer member to deflect in shear until said first and second load bearing members have moved a certain distance of travel,

whereby the frictional damping force obtained under rebound conditions initially consists of said second frictional damping force and then comprises the sum of said second frictional damping force and said third frictional damping force.



4,886,256

VEHICLE SUSPENSION DEVICE WITH A COIL SPRING EMBEDDED IN AN OPEN CELL FOAM

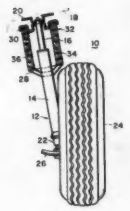
Masakazu Nishiyama, Tokyo; Takeyoshi Shinbori, Yokosuka, and Hideo Yamamoto, Yokohama, all of Japan, assignors to NHK Spring Co., Ltd., Yokohama, Japan

Continuation of Ser. No. 289,257, Aug. 3, 1981, abandoned. This application Jul. 29, 1985, Ser. No. 761,298

Claims priority, application Japan, Aug. 5, 1980, 55-107275; Dec. 1, 1980, 55-169366

Int. Cl.[4] B60G *11/52, 11/56*

U.S. Cl. 267—221 **31 Claims**



1. A vehicle suspension device which suspends an automotive vehicle body and a wheel, comprising:

an integrally formed metallic coil spring body having a predetermined number of coaxial turns, said coil spring body having at least one end turn at each opposite end portion thereof, and at least one intermediate turn between said opposite end turns;

first and second spring holder means at each end portion of said coil spring body, respectively, for seating the respective end portion of said coil spring body;

the vehicle suspension device, including said coil spring, having a given spring constant; and

means defining a foam resin generally cylindrical member in which said coil spring body is substantially completely embedded, said generally cylindrical member being arranged between said first and second spring holder means and comprising a soft flexible synthetic resin open-cell foam having surge-proof means and including waterproof means, said waterproof means rendering said foam resin substantially water impermeable, the modulus of elasticity of said open-cell foam being sufficiently small so that said open-cell foam cylindrical member causes substantially no change in said given spring constant of the vehicle suspension device, said generally cylindrical member having a wall extending in the axial direction of said coil spring body in which wall said coil spring body is substantially completely embedded, said wall having a thickness greater than the thickness of the material of said coil spring body as measured in the radial direction of said generallly cylindrical member;

wherein said generally cylindrical member prevents adjacent turns of said coil spring body from contacting one another when surging vibrations are applied to said vehicle suspension system;

said waterproof means comprising a hydrophobic agent in the foam resin in an amount sufficient so that moisture is prevented from permeating the foam resin and reacting with the coil spring body.

4,886,257

DEVICE FOR FIXING WORKPIECES TO A TABLE

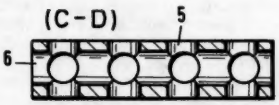
Horst Witte, Auf dem Deich Nr. 2, D-2122 Bleckede, Fed. Rep. of Germany, assignor to Horst Witte Entwicklungs-und Vertriebs KG, Bleckede, Fed. Rep. of Germany

Continuation of Ser. No. 917,420, Oct. 10, 1986, abandoned. This application Jan. 14, 1988, Ser. No. 144,721

Claims priority, application Fed. Rep. of Germany, Nov. 13, 1985, 3540221

Int. Cl.[4] B23Q *3/00*

U.S. Cl. 269—9 **8 Claims**



1. A device for fixing a workpiece to a machine tool table, consisting of:

(a) a parallelopiped base plate mountable on the machine tool table and provided with

(i) a first plurality of fitting holes each having a certain diameter and an axis and being arranged in equal coordinate spacings,

(ii) a first plurality of parallel, coplanar cross holes having the same diameter as the first plurality of fitting holes and having axes intersecting at right angles with the axes of the first plurality of fitting holes, and

(iii) a second plurality of parallel, coplanar cross holes having the same diameter as the first plurality of fitting holes and having axes intersecting with the axes of the first plurality of fitting holes and the first plurality of cross holes at right angles;

(b) a mounting part provided with a second plurality of fitting holes and third and fourth pluralities of cross holes, each of these holes having the same diameter as the first plurality of fitting holes and regular coordinate spacings identical to the first plurality of fitting holes of the base plate and intersecting axes like the first plurality of fitting holes and first and second pluralities of cross holes, and being connectable to the base plate by means of screws, nuts, and abutments

wherein each screw and nut can be inserted in any one of the cross and fitting holes and the cross-section of the screw and nut is substantially the same as the diameter of the first plurality of fitting holes,

(c) means for positioning the workpiece, said means being inserted into any one of said cross and fitting holes of the base plate and mounting part.

4,886,258

WELL LEG OPERATIVE SUPPORT

James W. Scott, P.O. Box 7630, Tifton, Ga. 31794

Filed Aug. 24, 1988, Ser. No. 235,621

Int. Cl.[4] A61G *13/00*; A61F *5/00, 5/37*

U.S. Cl. 269—328 **19 Claims**

1. A well leg operative support for use during an arthroscopic and/or incision surgical procedure comprising:

a generally L-shaped bar having,

a first leg, and

a second leg wherein said first leg is longer than said second leg and said first leg is operative to be securely retained by a clamp connected to an operating table;

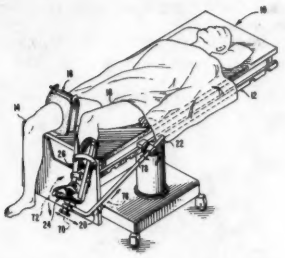
a generally L-shaped foot bracket adjustably connected to said second leg of said generally L-shaped bar;

a disposable boot operable to embrace the foot of a patient's well leg and releasably secure the foot to said L-shaped foot bracket, said disposable boot including

a foot portion,

a lower leg engaging portion,

at least one essentially rigid lateral splint member axially extending, in a pocket along said lower leg engaging portion to laterally stabilize said disposable boot wherein a patient's foot of a well leg may be operably secured to said L-shaped foot bracket and said L-shaped bar is axially adjusted within a clamp connected to an operating room table and said L-shaped foot bracket is rotationally and laterally adjusted with respect to said



second leg of said L-shaped bar to flex a patient's well leg hip and knee and abduct the well leg prior to an orthopedic examination and/or surgical procedure, said boot further comprising a longitudinally extending pocket fashioned along a back portion of said disposable boot and being operable to receive a long leg of said L-shaped foot bracket to releasably secure said disposable boot to said generally L-shaped foot bracket.

4,886,259

SORTER-FINISHER SYSTEM

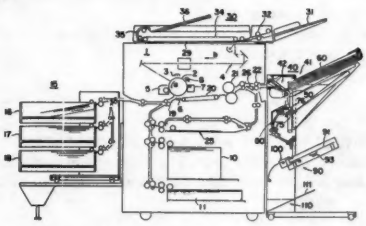
Takuma Ishikawa, and Kuniaki Ishiguro, both of Toyokawa, Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed Jul. 28, 1987, Ser. No. 78,753

Claims priority, application Japan, Aug. 2, 1986, 61-182469; Aug. 2, 1986, 61-182470; Aug. 2, 1986, 61-182471; Aug. 2, 1986, 61-182472

Int. Cl.[4] B42B *1/02*

U.S. Cl. 270—53 **14 Claims**



1. A sorter-finisher for sorting and binding sheets, comprising:

a plurality of bins with inclined sheet loading surfaces arranged vertically at specified intervals;

means for distributing sheets among said plurality of bins;

means located adjacent the plurality of bins for binding the sheets from each bin;

means, having a sheet receiving opening located below said plurality of bins, for receiving the sheets through said receiving opening and for transporting the sheets to said binding means; and

means for shifting said plurality of bins one by one to a position opposite said sheet receiving opening with an

inclination angle of each bin at the position opposite said sheet receiving opening being larger than that at the position for the distribution of the sheets.

4,886,260

METHOD AND APPARATUS FOR RECEIVING FOLDED PRINTED PRODUCTS FROM PRINTING MACHINES OR THE LIKE

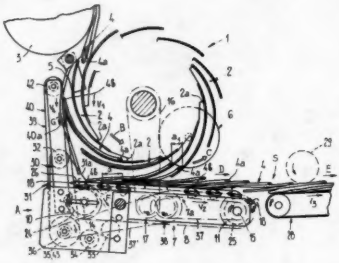
Walter Reist, Hinwil, Switzerland, assignor to Ferag AG, Hinwil, Switzerland

Filed Oct. 19, 1987, Ser. No. 109,365

Claims priority, application Switzerland, Oct. 22, 1986, 04 210/86

Int. Cl.[4] B65H *39/08*

U.S. Cl. 270—60 **33 Claims**



1. A method of receiving printed products, especially folded printed products, each having a leading edge and a trailing edge, from a revolvingly driven bucket wheel having compartments of a printing machine, comprising the steps of:

transferring the printed products out of the compartments of the revolvingly driven bucket wheel which rotates in a predeterminate rotational direction;

during said step of transferring said printed products out of said compartments of said revolvingly driven bucket wheel, fixedly retaining each printed product at a trailing edge of the printed product viewed with respect to the predeterminate direction of rotation of the revolvingly driven bucket wheel while the product is still partially within the bucket wheel;

placing the products in an imbricated product formation upon one another ; and

outfeeding the imbricated product formation.

4,886,261

SHEET FEEDER FOR A PRINTING MACHINE

Willi Jeschke, Bad Herrenalb, Fed. Rep. of Germany, assignor to Heidelberger Druckmaschinen AG, Heidelberg, Fed. Rep. of Germany

Filed Feb. 25, 1988, Ser. No. 160,400

Claims priority, application Fed. Rep. of Germany, Feb. 25, 1987, 3706058

Int. Cl.[4] B65H *5/08, 3/08, 3/46*

U.S. Cl. 271—11 **8 Claims**

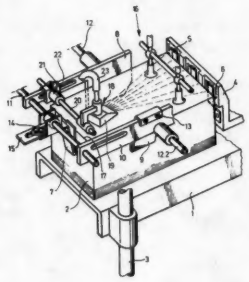
1. Sheet feeder for a printing machine comprising a receiving device adjustable in height for taking up a pile formed of individual sheets, a front stop for leading edges of the sheets, and at least one side stop for the side edges of the sheets at one side of a space wherein a pile is receivable; alignment elements located at least at an upper end of the pile-receiving space and having means located outside the pile-receiving space for adjusting said alignment elements so as to exert alignment forces on the pile towards the front and the side stops;

loosening means for neutralizing, at least partly, adherence of the upper sheets to one another; conveying means for gripping and withdrawing the respective uppermost sheet from the pile and feeding it into the printing machine; and

additional sheet alignment means acting upon an upper surface of the respective uppermost sheet, at least until it is gripped by the conveying means, in a way that said alignment means exert alignment forces upon the sheet towards at least one of said stops; said additional sheet alignment means being offset with respect to the conveying means towards respective trailing edges of the sheets.

7. Sheet feeder for a printing machine comprising a receiving device adjustable in height for taking up a pile formed of individual sheets, a front stop for leading edges of the sheets, and at least one side stop for the side edges of the sheets at one side of the pile; alignment elements located at least at an upper end of the pile and exerting alignment forces on the pile towards the front and the side stops;

loosening means for neutralizing, at least partly, adherence of the upper sheets to one another; conveying means for



withdrawing the respective uppermost sheet from the pile and feeding it into the printing machine; and

additional sheet alignment means acting upon the surface of the respective uppermost sheet, at least until it is taken over by the conveying means, in a way that said alignment means exert alignment forces upon the sheet towards at least one of said stops; said additional sheet alignment means being offset with respect to the conveying means towards respective trailing edges of the sheets, at least one stop is subdivided into a lower section with a vertical, planar stop surface merging into a substantially horizontal surface section along a small spacing below an upper edge of the sheet pile, and into an upper section adjoining said lower section, said upper section being formed of freely rotatable stop rolls having vertically disposed rotational axes and outer cylindrical surfaces removed from said planar stop surface by a spacing, as viewed in a direction towards said stop surface.

4,886,262

METHOD OF AND SYSTEM FOR TURNING OVER PAPERS IN A PAPER ARRANGING APPARATUS

Isamu Miura, 16-6 Ryuusen, 3-Chome, Taitoh-ku, Tokyo, Japan

Filed Sep. 4, 1987, Ser. No. 94,472

Claims priority, application Japan, Sep. 12, 1986, 61-215352

Int. Cl.[4] B65H *29/22*

U.S. Cl. 271—186 **10 Claims**

1. Paper arranging apparatus for turning over or inverting a pack of papers to be transferred by means of an operator from a paper feeding table to a paper piling table in a predetermined paper transferring direction along a predetermined paper flow path, comprising:

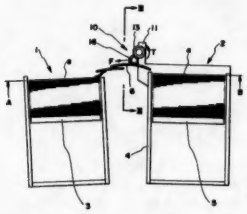
a paper feeding table having a longitudinal axis extending in a first predetermined direction along said predetermined paper flow path;

a paper piling table having a longitudinal axis extending in a

second predetermined direction along said predetermined paper flow path which is disposed at a predetermined angle with respect to said first predetermined direction of said paper feeding table;

crossing plate means, interposed between said paper feeding table and said paper piling table so as to define an operator station between said paper feeding table and said paper piling table whereby said pack of papers can be transferred by said operator from said paper feeding table to said paper piling table, and having a substantially arcuate configuration, within a substantially horizontal plane, as defined by a longer edge portion and a shorter edge portion, such that a portion of said predetermined paper flow path, defined upon said crossing plate means, is substantially curvilinear; and

rotary shaft means, having a tapered cross-section as viewed along an axial plane thereof such that the cross-sectional



diametrical extent thereof gradually decreases from one end thereof to the other end thereof with the larger diameter portion thereof disposed within the vicinity of the longer edge portion of said crossing plate while the smaller diameter portion thereof is disposed within the vicinity of said shorter edge portion of said crossing plate, disposed above said crossing plate in a direction transverse to said predetermined paper flow path and rotating in a direction opposite to said predetermined paper transferring direction, for receiving a trailing edge portion of said pack of papers, disposed upon said crossing plate, to be coiled about said rotary shaft means by said operator disposed at said operator station in a direction corresponding to said rotating direction of said rotary shaft means so as to invert said pack of papers about said rotary shaft means and to feed said inverted pack of papers along said curvilinear flow path portion of said predetermined paper flow path toward said paper piling table.

4,886,263

METHOD FOR SORTING PAPERBOARD BLANKS

Minoru Naito, 11-9, 6-chome, Takamoridai Kasugai-shi, Aichi, Japan

Filed Jan. 15, 1988, Ser. No. 144,194
Claims priority, application Japan, Jan. 21, 1987, 62-13137
Int. Cl.[4] B65H *29/66*
U.S. Cl. 271—176 **3 Claims**

1. A method for sorting paperboard blanks of a first length specified by a first order from paperboard blanks of a second length specified by a second order wherein a continuous paperboard web is cut into individual blanks of an identical length as specified by means of a particular order, and wherein the output blanks are fed by first and second conveyors in partially overlapped shingled condition, said method comprising the steps of:

sensing arrival of the last sheet of said blanks, as specified for said first order, at said first conveyor;

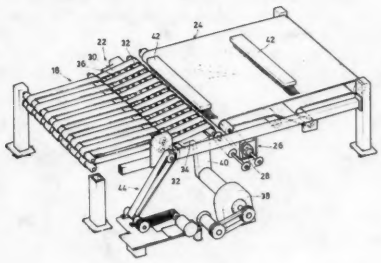
simultaneously accelerating said first and second conveyors;

sensing the transfer of all of said blanks, as specified for said first order, to said second conveyor;

momentarily stopping said first conveyor;

feeding a first sheet of said second order onto said first conveyor while said second conveyor is maintained in its stopped condition;

sensing the arrival of a second sheet of said blanks specified for said second order to said first conveyor which is maintained in its stopped condition; and



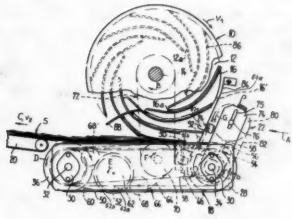
driving said first conveyor for a predetermined amount of time so as to move said first sheet of said second order, disposed upon said first conveyor, relative to said second sheet of said second order being conveyed onto said first conveyor whereby said first and second sheets of said second order will attain a shingled condition upon said first conveyor.

4,886,264

METHOD AND APPARATUS FOR RECEIVING PRINTED PRODUCTS FROM A REVOLVINGLY DRIVEN BUCKET WHEEL OF A PRINTING MACHINE

Egon Haensch, Wetzikon, Switzerland, assignor to Feraf AG, Hinwil, Switzerland

Filed Oct. 19, 1988, Ser. No. 259,922
Claims priority, application Switzerland, Oct. 23, 1987, 4159/87
Int. Cl.[4] B65H *29/40*
U.S. Cl. 271—229 **17 Claims**



1. A method for receiving printed products from a revolvingly drivable bucket wheel of a printing machine, comprising the steps of:

providing a product outfeed conveyor having a transport plane for the printed products defined by the product outfeed conveyor;

moving entrainment elements for the printed products through a path of travel which intersects the transport plane defined by the product outfeed conveyor at a predetermined intersection location;

engaging trailing edges of the printed products, as viewed with respect to a predetermined direction of rotation of the revolvingly drivable bucket wheel, by means of the entrainment elements; and

fixedly retaining the printed products at the intersection location by means of said entrainment elements until said

entrainment elements have passed beyond said intersection location.

4,886,265

APPARATUS AND METHOD FOR STACKING PRINTED PRODUCTS, ESPECIALLY PRINTED PRODUCTS ARRIVING IN AN IMBRICATED FORMATION

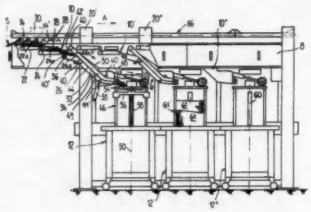
Jakob Wetter, Wetzikon, Switzerland, assignor to Ferag AG, Hinwil, Switzerland

Filed Sep. 26, 1988, Ser. No. 249,576

Claims priority, application Switzerland, Oct. 2, 1987, 3853/87

Int. Cl.[4] B65H *29/14*

U.S. Cl. 271—279 **16 Claims**



14. A method of stacking printed products, such as newspapers, periodicals and the like, arriving in an imbricated stream, comprising the steps of:

lowering a pivotable product infeed device into an operating position;

infeeding a predetermined number of printed products from the pivotable product infeed device to a stacker table while lowering the stacker table as a function of the pivot angle of the pivotal infeed device until there is formed on the stacker table a partial stack;

raising the pivotal product infeed device into a rest position;

pressing the partial stack formed on the stacker table or a plurality of partial stacks formed on the stacker table and rotating the stacker table with each partial stack formed thereon in conjunction with a stacker chute containing the stacker table about a substantially vertical axis through an angle of about 180°;

upon reaching a predetermined total stack height of printed products retaining the pivotal product infeed device in the operating position thereof;

pressing the total stack height of stacked products;

lowering the stacker table and the total stack height of stacked products;

ejecting the stacked products; and

thereafter placing the stacker table in an upper terminal position.

4,886,266

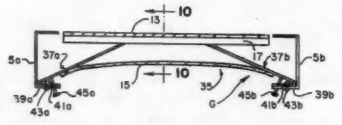
EXERCISE TREADMILL

James A. Trulaske, Maryland Heights, Mo., assignor to True Fitness Technology, Inc., O'Fallon, Mo.

Filed May 23, 1988, Ser. No. 197,154

Int. Cl.[4] A63B *23/06*

U.S. Cl. 272—69 **9 Claims**



1. An exercise treadmill comprising a frame having a pair of spaced side members extending generally lengthwise of said treadmill, a pair of generally parallel, spaced rollers journalled on and extending transversely between said side members, an endless belt entrained around said rollers and providing an upper reach on which a user of said treadmill runs or walks and a lower reach, means for driving one of said rollers to drive said endless belt in a predetermined endless path around said rollers, belt support means carried by said frame for supporting the upper reach of said belt, and resilient belt guide means engaging said belt support mean for maintaining said endless belt in said predetermined endless path as it moves around said rollers, said belt guide means imparting a deflecting force on the lower reach of said belt for, at least in part, deflecting said endless belt adjacent opposite marginal edge portions thereof in the vicinity of at least one roller prior to the movement of said endless belt from the lower reach to the upper reach thereby to confine said endless belt in said predetermined endless path as it moves around said rollers.

4,886,267

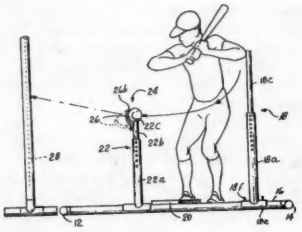
BASEBALL PRACTICE APPARATUS

Terrence P. Licciardi, 73 Cox La., and James P. Licciardi, 16 Madison St., both of Methuen, Mass. 01844

Continuation of Ser. No. 19,373, Feb. 26, 1987, abandoned. This application Jul. 29, 1988, Ser. No. 226,273

Int. Cl.[4] A63B *69/40*

U.S. Cl. 273—26 R **12 Claims**



1. A batting swing practice apparatus for baseball batters of different sizes and batting stances comprising:

a base plate member, a batting tee and a swing guide means, said base plate, batting tee and swing guide being positioned on and above said central support member;

an elongated central member;

said base plate member having a configuration simulating a conventional home plate disposed on said central support member and detachable therefrom; said batting tee being vertically adjustable and having its lower end attached to said central support member adjacent to and forward of said base plate member;

a baseball support means disposed on the upper end of said batting tee; and

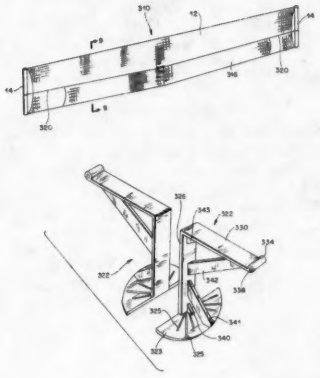
vertically extending swing guide means attached to said central support member and movable thereon relative to said base plate to a position sufficiently rearward of said base plate member to enable a batter to stand therebetween to swing a bat, but within the path of the swing of said bat whereby initial swinging contact of the bat with said swing guide means indicates an improper initial swing; and initial swinging of the bat without contact with said swing guide means indicates a proper initial swing.

4,886,268

BALL CAPTURING TENNIS NET ASSEMBLY

Eric B. Langslet, 4 Hilton Pl., Montvale, N.J. 07645

Filed May 9, 1988, Ser. No. 191,364
Int. Cl.[4] A63B *69/38*
U.S. Cl. 273—29 A **8 Claims**



1. A ball capturing tennis net assembly for use with a conventional tennis net which is stretched across the center of a tennis court between two support members so as to extend at a predetermined height above the playing surface of the tennis court, said ball capturing tennis net assembly comprising:

a) a first ball capturing net stretched between said two support members across the center of the tennis court in substantially parallel, spaced relation to said conventional tennis net at a height lower than said predetermined height said first ball capturing net having opposite end, each said end having means for connection with a said support member; and

b) spacer means for spacing said first balls capturing net away from said conventional tennis net, said spacer means being positioned between opposite ends of said ball capturing net, said spacer means including:

i) base means for supporting said spacer means on a tennis court.

ii) a vertical support extending upwardly from said base means substantially to said lower height,

iii) a transverse member extending outwardly from the upper end of said vertical support and away from said conventional tennis net, and

iv) securing means on said transverse member for releasably securing said first balls capturing net to said transverse member in spaced relation to said conventional tennis net.

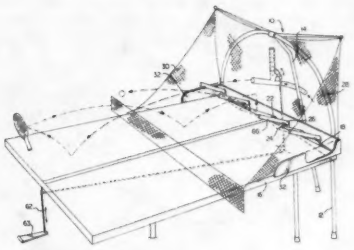
4,886,269

TABLE TENNIS PRACTICE AID

Claude C. A. Marocco, 172 Evans St., Rozelle, Australia 2041

Continuation of Ser. No. 1,658, Feb. 1, 1986, Pat. No. 4,735,405. This application Apr. 4, 1988, Ser. No. 177,387
Int. Cl.[4] A63B *39/00*
U.S. Cl. 273—30 **4 Claims**

1. A table tennis practice device adapted to be attached to a table tennis table and to project table tennis balls across the table towards a user, the device comprising an undulating base surface a source of compressed air and at least one ejector tube which can be variably angled relative to the table, said ejector tube being substantially straight and being operatively connected at one end to the source of compressed air, said ejector tube having intermediate its ends a downwardly opening aperture in its peripheral wall, said aperture being disposed adjacent and above said undulating surface, said surface being contiguous with the table to guide table tennis balls towards the aperture, and having at least one undulating surface portion



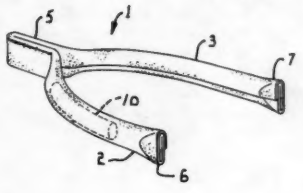
arranged so as to slope downwardly towards a point immediately below said at least one aperture in said ejector tube such that a ball rolling on said undulating surface will be sucked through said aperture and into said at least one ejection tube.

4,886,270

WISHBONE SHAPED AMUSEMENT DEVICE

Herbert Arenson, Shawnee Mission, Kans., and Ann K. Jordan, Monument, Colo., assignors to Wish-Bon, Inc., Leawood, Kans.

Filed Feb. 7, 1989, Ser. No. 307,881
Int. Cl.[4] A63F *9/00*
U.S. Cl. 273—139 **6 Claims**



1. A comestible comprising:

a. a wishbone shaped body comprising of spaced, diverging legs joined at a head portion, said body being formed of an edible material;

b. an attractant material of a different substance than said body, emplaced within at least one of said legs, and comprising a prize for a consumer of said body; and

c. frangible separation means connecting said legs to said head portion whereby, upon separation of at least one leg from said head portion, said attractant material is exposed.

4,886,271

RANDOM NUMBER SELECTION DEVICE FOR LOTTERIES AND GAMES

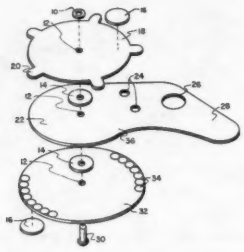
Robert L. Brown, P.O. Box 31413, Tucson, Ariz. 85751

Filed Oct. 31, 1988, Ser. No. 264,769
Int. Cl.[4] A63F *5/04*
U.S. Cl. 273—142 HA **6 Claims**

1. A device for random number selection that includes random number elimination comprising:

an upper disc with a number of protruding pegs extending radially outward from center of said disc and a center planar support bearing view ports with a partial spherical circumference at one end with said support serving as a handle with a thumb rest hole at the opposite end, a lower disc bearing radially aligned indicia extending outward

from its center in a circular concentric pattern and a means of embodying an imbalance of weight to outer circumference areas of said discs in an isolated proportion, a means of connecting said lower disc and said upper disc to said center planar support so said disc will gyrate relative to one another on a common axis and relative to said center planar support's partial spherical circumference wherein the pegs of said upper disc when gyrated will



radially align with said center support's said view ports, wherein said lower disc when gyrated will revolve its concentric indicia to align with said center support's view ports and opposing pegs of said upper disc and wherein there exists a computed separation and alignment of said radially positioned view ports whereby said view ports will indicate a whole indicia in one or the other of said view ports.

4,886,272

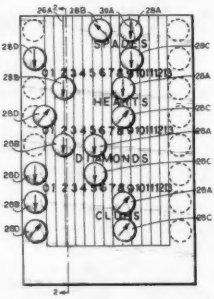
CARD GAME PLAYING AID

Herbert H. Adise, 65 Dickenson Pl., Great Neck, N.Y. 11023

Filed Nov. 7, 1988, Ser. No. 268,170

Int. Cl.[4] A63F *1/18*

U.S. Cl. 273—148 R **5 Claims**



1. A card game playing aid which stores and displays characteristic parameters of playing card hands including the total number of cards held in each suit, the ranked cards held in each suit, the spot cards held in each suit, the cards which have been discarded during play and their source, the discarded cards which have been retrieved during play and their destination, and the source and destination history of discard and retrieval of individual cards, comprising:

a display support structure,

means for reference affixed to said display support structure, indicating means denoting characteristic parameters of card holdings, adapted to be positioned on the display support structure in cooperative alignment with said reference means, where said position settings are determined by factors including the number of cards and the individual ranked cards in each suit which are exposed at the start of play, the numbers, ranking and source of suit cards exposed during play, the inferences obtained prior to the start of play regarding numbers, rank and location of concealed suit cards, the inferences obtained during play regarding the number, rank and location of concealed suit cards, and the number, ranking, source and destination of individual suit cards exposed during play,

means for displaying the position of said indicating means, whereby a card game player can establish and have displayed the make-up of card hands held concealed from his view by other players, without the need for card memorization or other mental visualization.

4,886,273

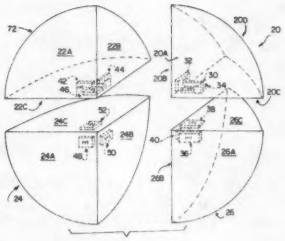
TOY AND PUZZLE WITH REVERSIBLE BREAKABILITY

Vicki Unger, 4141 Reinhardt Dr., Oakland, Calif. 94619

Filed Oct. 3, 1988, Ser. No. 252,694

Int. Cl.[4] A63F *9/12;* **A63B** *43/00;* **A63H** *33/10*

U.S. Cl. 273—157 R **8 Claims**



4. A reversibly disassemblable toy, comprising:

a plurality of elements each said element comprising a portion of a given geometrical shape and having a plurality of flat faces, said faces being formed of high-impact material and bound together at edges thereof to form said elements, wherein said elements are configured for assembly into said geometrical shape; and

a magnet carried at each said flat face, said magnets having positive and negative polarities configured such that, upon said assembly, said shape is maintained by said magnets, where said material is chosen such that a first force necessary to separate said elements from one another by impact with a surface is less than a second force necessary to cause structural damage to said elements;

wherein, upon assembly of said geometrical shape, each said flat face opposes one other said flat face, and wherein:

each said element inciudes a vertex defined by an intersection of said plurality of flat faces; and

each said magnet is mounted at a distance from one said vertex of a given said flat face, said distance being minimized by locating said magnets as close as possible to said vertices without substantially interfering with magnetic fields from magnets mounted on other said faces which are not opposed to said given flat face.

4,886,274

PORTABLE PRACTICING PUTTING GREEN

Young Go Park, Apartment #KA-305 Dong-A Apartments, No. 902 Dachi-dong, Dachi-dong Kangnam-ku, Seoul 135-280, Rep. of Korea

Filed Jun. 28, 1988, Ser. No. 212,704

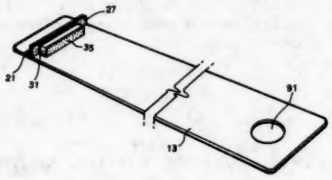
Claims priority, application Rep. of Korea, Nov. 24, 1987, 20342[U]

Int. Cl.[4] A63B *67/02*

U.S. Cl. 273—176 FB **12 Claims**

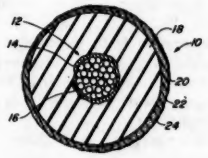
1. A portable practice putting green for use with a golf ball and golf putter, comprising:

a putting surface band;
a square angle; and
a rebound square bar;
said putting surface band being made of flexible material, and having a first two bolt holes at one end thereof which are on a line perpendicular to a center line of said putting surface band;
a first rubber plate;
said square angle being made of a rigid material having one exterior side bonded to said first rubber plate and having a second two bolt holes at an end of another side of said



angle, said second bolt holes being bolted together with respective ones of said first bolt holes of said putting surface band;
said rebound square bar being made of metal plated with another metal, and having three of four sides bonded by thin, medium, and thick rubber plates on three sides respectively with its fourth side remaining as a bare metal surface, disposable on said putting surface band and aside said first rubber plate of the square angle to expose a selected one of said four sides and thereby provide varying rebounding forces to a golf ball traveling along said putting surface band toward said rebound square bar.

4,886,275
GOLF BALL
Grant W. Walker, 4339 Lantzy Ct., Sacramento, Calif. 95825
Filed Dec. 15, 1988, Ser. No. 284,722
Int. Cl.[4] A63B *69/36*
U.S. Cl. 273—183 C **18 Claims**

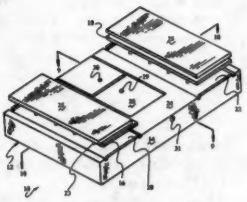


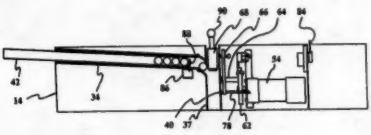
1. A moderately resilient, energy-absorbing practice golf ball comprising:
a. a dense metal-containing core;
b. a thick layer of resilient material bound around said core, said thick layer having a substantially spherical outer surface; and,
c. a textile fabric cover bound to said surface of said resilient material for carrying marking powder.

4,886,276
GOLF TEE PLATFORM DEVICE
Joseph A. Digangi, 427 Glendale St., Owatonna, Minn. 55060, and Daron L. Call, Rte. 1, Box 167, Claremount, Minn. 55924
Filed Sep. 14, 1988, Ser. No. 244,509
Int. Cl.[4] A63B *69/36, 57/00*
U.S. Cl. 273—201 **11 Claims**

1. A device for supporting a standing golfer and a golf ball such that said golfer may address the ball, said device comprising:
(a) a generally rectangular, raised platform molded of a rigid plastic, said platform including a top and four sides, said top defining a ball carrying surface and a golfer carrying surface, said golfer carrying surface defining a plane which is parallel to, but lower than a plane defined by said ball carrying surface;
(b) a load distributing member substantially covering said golfer carrying surface and being attached thereto, said load distributing member being heat resistant and of a thickness such that when so positioned, the upper surface of the load distributing member will be substantially planar with said ball carrying surface; and
(c) a covering of carpet overlaying the surface of said ball carrying surface and upper surface of said load distributing member.

9. A mechanism for supplying golf balls on a tee through a hole in a golfing platform upon depression of a switch by a golfer, the mechanism comprising:
(a) a generally tee shaped tube having a straight leg and a tee leg angled from said straight leg; said tee leg entering said straight leg at an angle of about 75 to 85 degrees, each of





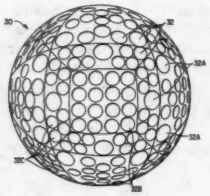
said legs defining passageways through which a golf ball may readily pass, the intersection of said tee leg and said straight leg being toward the top of said straight leg when said straight leg is positioned vertically, when so positioned, the lower portion of said intersection having a smooth radius internally so as to allow a ball to move from said tee leg to said straight leg and the upper portion of said intersection having a downwardly projecting member to direct balls down into said straight leg said straight leg being constructed and arranged so as to define a groove opposite said tee leg extending along the length of said straight leg between the ends of said straight leg;
(b) means for raising and lowering a flexible tee within said straight leg comprising a tee holder which extends through said groove in said straight leg and which is slidably mounted to a lever member, said lever member being linked to a lift rod on a cam driven by a motor which when rotated by said motor causes said tee holder to rise and fall within said straight leg, and
(c) means for remotely operating said motor including a switch which may be actuated a golfer so as to cause the cam to cycle down to allow a ball to be deposited in said tee and to cycle up to its highest point presenting a ball on said tee above the top of said straight leg.

4,886,277

GOLF BALL

Gary T. Mackey, Argyle, Tex., assignor to American Ball Manufacturing, Corp., Carrollton, Tex.

Filed Jul. 28, 1988, Ser. No. 225,259
Int. Cl.[4] A63B 37/14
U.S. Cl. 273—232 5 Claims



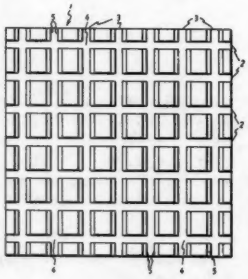
1. A golf ball having a spherical surface with a plurality of dimples formed therein and four great circle paths which do not intersect any of said dimples, said dimples being arranged by dividing said spherical surface into six identical spherical squares and eight identical spherical hexagons, and said dimples being organized in discrete groups, wherein at least a major portion of the dimples in each group are positioned within a different one of said spherical squares and spherical hexagons.

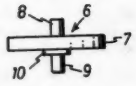
4,886,278

GAME APARATUS

Avril M. Salter, 34 Lea Road, Wallasey, Merseyside, L44 0DU, and John O'Reilly, 8, Worcester Road, Bidston, Birkenhead, Merseyside L43 7QB, both of England

Filed Nov. 2, 1988, Ser. No. 266,150
Claims priority, application United Kingdom, Nov. 3, 1987, 8725728
Int. Cl.[4] A63F 3/02
U.S. Cl. 273—242 6 Claims





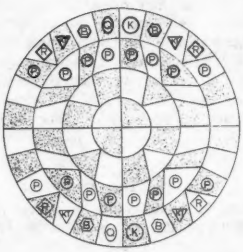
1. An apparatus for playing a game comprising a board, said board comprising an upper surface defining a first set of grooves extending parallel to one another, and a second set of grooves extending parallel to one another, all of said grooves in each of said sets having an identical cross-sectional configuration relative to one another but different to the cross-sectional configuration of said grooves in said other set, said grooves in said first set intersecting said grooves in said second set, said intersections forming play locations, a plurality of playing pieces locatable within said grooves so as to be slidably displaceable between said play locations, each said playing piece comprising a body portion comprising at least first and second projection portions locatable in said grooves, said first projection portion corresponding to a first position of use and permitting sliding displacement of said playing piece along said grooves forming each of said sets, and said second projection portion corresponding to a second position of use and permitting sliding displacement of said playing pieces along said first set of grooves but precluding said sliding displacement along said second set of grooves.

4,886,279

CIRCULAR CHESS/CHECKERS BOARD METHOD OF PLAY

William A. Taylor, #10 - 124 Lewis Street, Winnipeg, Manitoba, Canada R3L 1W9

Filed Sep. 15, 1988, Ser. No. 244,293
Int. Cl.[4] A63F 3/02
U.S. Cl. 273—261 8 Claims



1. A method for playing a game, said game having a game board with four concentric rings, the center ring being a circle, each ring being marked off symmetrically in 8N-4 playing areas where N is the number of the ring counting from the center outwards, the playing areas including four rows of corner areas radiating symmetrically from the center of the first ring, and abutting playing areas being of contrasting colors, said method comprising:

arranging a standard set of chess pieces on opposite sides of the board, with each first rank extending along the fourth ring from one corner area to the next adjacent corner area and each the second rank starting on the fourth ring adjacent the ends of the associated first rank and extending along the third ring therebetween;

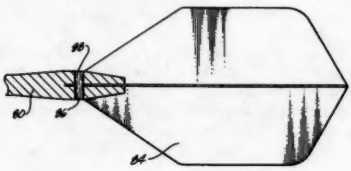
starting and continuing play according to the standard rules of chess, with the king and queen files extending along opposite sides of a diametral line across the board, each bishop file having one playing area at each end in the fourth ring, the next adjacent playing area in the third ring and four adjacent playing areas in the second ring, each knight file having one playing area at each end in the fourth ring and six playing areas in the third ring and each rook file having eight playing areas in the fourth ring, extending from one corner area to the next corner area; and

in addition to the standard rules of chess, allowing rook pieces to travel along at least the fourth ring, beyond at least one corner area thereof on a single move.

4,886,280
DART WITH FLIGHT LOCK

Walter E. Bottelsen, 309 Felicia Dr., Santa Maria, Calif. 93455

Continuation-in-part of Ser. No. 8,842, Jan. 30, 1987, Pat. No. 4,775,158. This application Jan. 15, 1988, Ser. No. 144,325
Int. Cl.[4] A63B *65/02*
U.S. Cl. 273—423 2 Claims

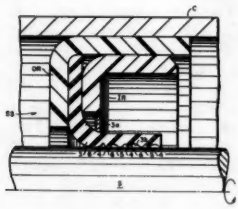


1. A dart comprising:
a barrel;
a tip coaxially mounted at the forward end of the barrel;
a shaft extending rearwardly from the rearward end of the barrel comprising an elongated shaft body and a flight lock at the rearward end of the shaft body, said flight lock comprising:
a generally x-shaped slit extending forwardly from the rearward end of the shaft for receiving the forward end of a flight;
a locking hole extending transversely through the shaft at a position rearward of the forward end of a the slit for receiving a locking pin; and
a wooden tapered locking pin removably inserted into the locking hole;
a flight mounted in the x-shaped slit such that the locking pin punctures and passes through the flight, thereby preventing inadvertent removal of the flight from the shaft.

4,886,281
SEALING RING HAVING A SEALING SURFACER WITH A RECESSIONAL ANNULAR PROJECTION

Peter Ehrmann, Karlsruhe; Karl-Heinz Spies, Birkenau, and Rolf Vogt, Schwetzingen-Oftersheim, all of Fed. Rep. of Germany, assignors to Firma Carl Freudenberg, Weinheim and der Bergstrasse, Fed. Rep. of Germany

Continuation of Ser. No. 922,687, Oct. 24, 1986, abandoned. This application Mar. 23, 1988, Ser. No. 172,998
Claims priority, application Fed. Rep. of Germany, Dec. 21, 1985, 3545683
Int. Cl.[4] F16J *15/32*
U.S. Cl. 277—47 21 Claims

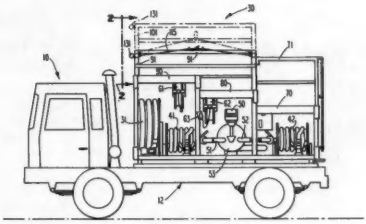


1. In a ring seal for sealing about a relatively-rotatable shaft having a substantially cylindrical, rotatable contact surface to be sealed, said ring comprising:
(a) a rigid holding ring adapted to be mounted around, and substantially coaxially with, the shaft;
(b) a resilient sealing ring supported by said holding ring, said sealing ring having a substantially cylindrical resilient sealing surface adapted to be held substantially coaxially with the shaft, having means for resiliently bearing said sealing surface with surface-to-surface contact against the contact surface of the shaft, and having at least one annular projection extending radially inwardly from said sealing surface for contacting the contact surface of the shaft, said sealing ring being in a compressed state between said holding ring and the shaft when said holding ring and sealing ring are mounted around the shaft, and in a non-compressed state when said holding ring and sealing ring are unmounted;
the improvement wherein said at least one projection has a height from said sealing surface, when said sealing ring is in said non-compressed state from about 0.04 to about 0.8 mm; and
wherein at least a portion of said sealing ring at said sealing surface is made of a rubber material with a Shore A hardness in the range of about 65 to 90, thereby making said at least one projection recessional into said sealing surface, when said holding ring and said sealing ring are mounted around the shaft, in such a way as to leave an annular portion of said sealing surface in contact with the shaft at an annular surface region spaced axially from the respective projection and leaving an annular pocket between said annular portion in contact with the shaft and said respective projection for the entrapment of lubricant during operation when said shaft is rotating.

4,886,282
HYDRANT REFUELER

Michael J. Wilkinson, Willow Grove; Robert G. Watkins, Jr., Coatsville, and Edward A. Sell, Parkside, all of Pa., assignors to General Transervice, Inc., Chester, Pa.

Filed Oct. 24, 1988, Ser. No. 261,561
Int. Cl.[4] B60P *3/00*
U.S. Cl. 280—4 7 Claims



1. A hydrant refueler for aircraft comprising:
a. a delivery fuel hose having at one end coupling means for coupling to a fuel intake valve of an aircraft;
b. a plurality of decks fixedly supported at different levels on said hydrant refueler for supporting a refueling operator, each deck being at a level adapted to facilitate coupling by the operator to a fuel intake valve of an aircraft, thereby to give the hydrant refueler the capability of refueling different aircraft having wings at different heights;
c. a first pair of fixed side guard railings for a lower level deck, said first railings having a fixed height;
d. a second pair of fixed side guard railings for an upper level deck,
e. a pair of foldable side guard railings, one each mounted pivotally on each of said second pair of fixed side guard railings, said foldable railings adapted to be raised to a height above that of said second fixed side guard railings to provide safety for an operator working on said upper level deck;
f. a rigid cross bar guard and means for connecting opposite ends of said cross bar guard pivotally to each of said pair of foldable side guard railings at an upper end thereof.

4,886,283

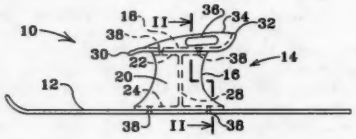
RECREATIONAL VEHICLE

Robert R. Wells, 15 Fairwood View Ct., Phoenix, Md. 21131

Filed Jul. 18, 1988, Ser. No. 220,611

Int. Cl.[4] B62B *13/00*

U.S. Cl. 280—14.1 **20 Claims**



1. A recreational vehicle upon which a rider may ride down a slope, comprising:

a runner member extending in a longitudinal direction;

a seat member secured to the runner member;

said seat member including a seat portion and a pedestal support member, said seat portion being secured to said pedestal support member and said pedestal support member being readily releasably secured to said runner member;

said runner member being a ski with spaced apart ski bindings; p1 vertically disposed, removable and replaceable, spacer members which are changed in number for selectively changing a dimension in said longitudinal direction of said pedestal support member to a size dependent upon the spacing between said ski bindings; p1 two adaptor members engageable with said ski bindings to be releasably clamped thereby to said ski; and p1 means for securing said adaptor members to said support member with said spacer members sandwiched between said adaptor members and vertical surfaces of said support member.

4,886,284

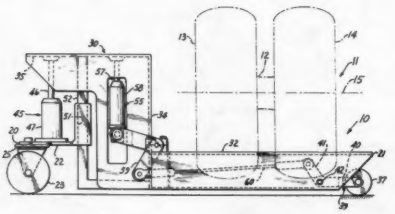
DOLLY FOR SUPPORTING OBJECTS WITH ADJUSTABLE HEIGHT AND INCLINATION

Antonio Martinez, Jr., El Monte, Calif., assignor to Atel Corporation, South El Monte, Calif.

Filed Nov. 4, 1983, Ser. No. 549,266

Int. Cl.[4] B62D *21/02*

U.S. Cl. 280—43.12 **15 Claims**



1. A dolly for supporting and aligning objects, which objects have a central axis whose elevation and inclination are to be adjusted while the object is supported by the dolly, said dolly comprising:

a base member adjacent to a first end of said dolly;

a support member adjacent to a second end of said dolly; said ends being longitudinally spaced apart form one another;

first wheel means supporting said base member;

second wheel means supporting said support member, said first and second wheel means being longitudinally spaced apart from one another;

pivotable lever means mounting said second wheel means to said support membe,r whereby pivoting movement of said lever means selectively raises or lowers said second end of said dolly relative to said second wheel means;

first elevator means interposed between said base membe and said support member so disposed and arranged as selectively to raise or to lowe said support member relative to said base member at a location longitudinally removed from said second wheel means;

second elevator means so disposed and arranged between said support member and said lever means, as to cause said pivotable movement,

said elevator means being separte from one another, and separately operable, whereby the elevation of said support member, without changing its inclination, can be adjusted by simultaneous actuation of both of said elevator means, and the inclination of said support member can be adjusted by differential actuation of either or both of said elevator means.

4,886,285

TRANSPORTER WITH WHEELS

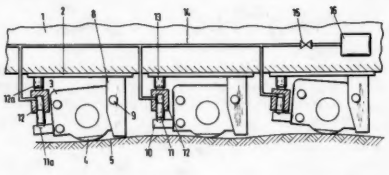
Rainer Horbach, Witten, and Hermann Osthoff, Wetter, both of Fed. Rep. of Germany, assignors to Mannesmann Aktiengesellschaft, Dusseldorf, Fed. Rep. of Germany

Filed Mar. 22, 1988, Ser. No. 171,847

Claims priority, application Fed. Rep. of Germany, Mar. 23, 1987, 3709530

Int. Cl.[4] B60S *9/12;* B60G *11/26*

U.S. Cl. 280—43.14 **11 Claims**



1. A transporter having wheels, said transporter being for intra-plant transport of loads, said transporter comprising:

a suspension arrangement for supporting a load, said suspension arrangement comprising a plurality of:

individual units each having a wheel for making contact with and for riding at least above floors in and around plants;

said individual units each having a pivot arrangement;

said plurality of units each having a first end and a second end, said first and second ends disposed one after the other in a row in a direction of travel of said transporter;

the pivot arrangements, being disposed at the first end of their corresponding individual units, for pivoting their associated wheels at least up and down;

the wheels being disposed in at least two rows, one on each side of the transporter, the wheels of each row being disposed one behind the other;

each of the wheels being mounted on a pivotable mount for being pivoted about its corresponding pivot arrangement;

each of the wheels being disposed on its corresponding mount away from its associated pivot arrangement;

hydraulic cylinders with pistons disposed therein for raising and lowering the transporter by pivoting each said wheel on its corresponding mount about its corresponding pivot arrangement; and

a hydraulic supply arrangement connected to the hydraulic cylinders;

said hydraulic supply arrangement comprising:

a hydraulic line directly connecting the hydraulic cylinders of the wheels arranged in a row on one side of said transporter to permit flow of hydraulic fluid between said

hydraulic cylinders of that one row of the wheels arranged in a row on one side of said transporter to compensate for level differences of the floors; and

wherein each said individual unit has a foot disposed at said first end, said foot extending downwardly a substantial distance toward the floor in a raised load position of said transporter and said foot being for contacting, in a lowered load position of said transporter, with a member chosen from the group consisting essentially of: a floor and a rail disposed on a floor.

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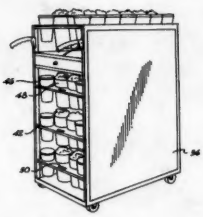
PORTABLE CONCESSION STAND

Robert B. Whorton, III, 4445 Grissom Rd., Spartanburg, S.C. 29301

Filed Nov. 12, 1986, Ser. No. 929,757
Int. Cl.[4] B62B *3/00*
U.S. Cl. 280—47.35 **1 Claim**



1. A movable concession cart for transporting containers across a transport surface from one place to another, the movable concession cart comprising:

a plurality of extruded tubular metal frame members; said plurality of extruded tubular metal frame members being constructed together to create a generally rectangularly-shaped frame structure;

a plurality of panel members attached to said frame structure to create a generally rectangularly-shaped box-like structure defining an interior portion, an exterior portion, a top surface, and a bottom surface; each of said plurality of panel members having an inner sheet member, an outer sheet member, and a core material disposed therebetween to which said inner sheet member and said outer sheet member are bonded;

a plurality of generally rectangularly-shaped trays, each having a plurality of openings defined therein for receipt of said containers;

a plurality of extruded tray support members provided in said interior portion of said generally rectangularly-shaped box-like structure for supporting said plurality of generally rectangularly-shaped trays thereon;

a cash drawer provided in said interior portion of said generally rectangularly-shaped box-like structure, said cash drawer being slidingly movable to a position within and to a position without said interior portion of said generally rectangularly-shaped box-like structure;

a plurality of rollers provided on said bottom surface of said generally rectangularly-shaped box-like structure on which the concession cart may be transported across the transport surface through rolling motion of said plurality of rollers;

at least one cart handle associated with said generally rectangularly-shaped frame structure for grasping and guiding the movable concession cart;

a pivotable brake lever associated with said at least one of said plurality of cart handles;

a longitudinally-extending connecting member pivotally connected to said pivotable brake lever, said longitudinally-extending connecting member moving substantially rectilinearly responsive to pivoting of said pivotable brake lever;

a brake assembly associated with said bottom surface of said generally rectangularly-shaped box-like structure, said brake assembly including:

(i) a brake frame structure;

(ii) a transfer member associated with said brake frame structure and pivotally connected to said longitudinally-extending connecting member, said transfer member pivoting responsive to said substantially rectilinear movement of said longitudinally-extending connecting member;

(iii) a first linkage assembly pivotally connected to said transfer member for movement responsive to pivoting of said transfer member;

(iv) a second linkage assembly pivotally connected to said brake frame structure and pivotally connected to said first linkage assembly for pivotal movement responsive to movement of said first linkage assembly;

(v) a third linkage assembly pivotally connected to said first linkage assembly for movement responsive to movement of said first linkage assembly;

(vi) a fourth linkage assembly pivotally connected to said brake frame structure and pivotally connected to said third linkage assembly for movement responsive to movement of said third linkage assembly;

(vii) a foot member associated with said third linkage assembly and said fourth linkage assembly, said foot member being movable to a retracted position adjacent said brake frame structure, to an extended locking position distal from said brake frame structure, and to an intermediate braking position between said retracted position and said extended locking position; said movement of said foot member between said retracted position, said intermediate braking position and said extended locking position being effected by movement of said third linkage assembly and said fourth linkage assembly;

(viii) a resilient member attached to said foot member for frictionally engaging the transport surface across which the movable concession cart is movable to provide a braking action for the movable concession cart when said foot member is in said intermediate braking position;

(ix) a biasing element associated with said first linkage assembly, said biasing element biasing said foot member towards said intermediate braking position; said connecting member being movable substantially rectilinearly in a predetermined manner for overcoming said biasing of said foot member by said biasing element for causing said foot member to move to said retracted position adjacent said brake frame structure; and

(x) said foot member being movable to said extended locking position for causing said resilient member to statically engage the transport surface across which the movable concession cart moves to prevent movement of the movable concession cart relative to the transport surface.

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ROW BAR-ACTUATED LAND VEHICLE

Alan E. Krause, II, Eureka, and Russell G. Willett, Arcata, both of Calif., assignors to Jack Cherubini, Yucca Valley, Calif.

Filed Mar. 15, 1988, Ser. No. 168,171
Int. Cl.[4] A63B *69/06;* **A62M** *1/14*
U.S. Cl. 280—246 **5 Claims**

1. A wheeled vehicle of the row bar-type for propelling a rider on the vehicle in response to upper body exercise of the rider producing a rowing motion of the row bar, the vehicle comprising:

a frame for supporting the weight of a rider;

a front wheel mounted on a front portion of the frame;

a pair of rear wheels mounted on opposite sides of the frame;

front steering means on the front wheel for steering the vehicle with the feet of the rider;

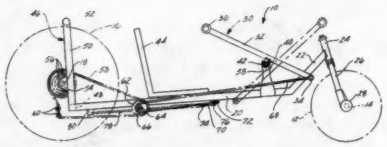
an elongated row bar mounted to pivot about a fulcrum carried on the frame, the row bar having an upper portion which moves forward and is pulled backward by the rider to thereby reciprocate the row bar and cause a lower portion of the row bar to reciprocate in the backward and forward directions, respectively;

a drive sprocket mounted on the frame to the rear of the row bar;

a fixed pulley mounted on the frame between the bottom of the row bar and the drive sprocket;

a travelling pulley for travelling between the fixed pulley and the drive sprocket;

drive means comprising a drive chain extending from the bottom portion of the row bar, around the drive sprocket and toward the fixed pulley to an elongated inelastic cable extending from the drive chain, around the fixed pulley,



back around the travelling pulley, and back to a fixed point of attachment on the frame;

a return spring extending from the travelling pulley away from the fixed pulley and to a fixed point of attachment on the frame, whereby a pulling force applied to said row bar pivots the bottom of the row bar in the forward direction to move the drive chain in the forward direction, against the bias of the return spring, to thereby drive the drive sprocket; and

means coupled between the rear wheels of the drive sprocket for driving the rear wheels to propel the vehicle in the forward direction in response to the drive sprocket being driven by the row bar and the drive chain;

the drive means allowing travel of the drive chain in the backward direction in response to a release of said pulling force on the row bar, which allows free-wheeling of the rear wheels while the return spring applies tension to the drive chain and the cable in response to the backward travel of the drive chain.

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DEVICE AND METHOD TO SAFELY ELEVATE STABILIZE AND LOWER A WHEEL CHAIR

Edward D. Dysarz, 11423 Triola La., Houston, Tex. 77072

Filed Mar. 25, 1988, Ser. No. 173,126

Int. Cl.[4] B62M *1/14*

U.S. Cl. 280—250.1 **22 Claims**

1. A wheel chair for transporting and supporting a disabled person on and above a floor and further elevating said wheel chair while said disabled person remains supported by said wheel chair comprising:

cylinders, each said cylinder with an uppermost end and a lowermost end;

said cylinders, wherein said cylinders are nearer to each other at their said uppermost end and wherein said cylinders are sloping away from each other to where they are further apart from each other at their said lowermost ends;

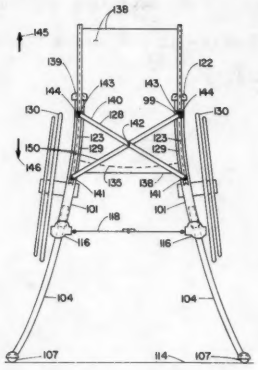
said cylinders, wherein said cylinders are further curved;

support members, wherein said support members are fixed to said cylinders, fixing said cylinders in a position relative to each other;

A frames, said A frames are formed by said cylinders and support members and wherein there are two said A frames and wherein each said A frame is disposed on each side of said wheel chair;

A seat, said seat is disposed between each of said A frames and said seat is further fixed to said support members;

leg means, said leg means with an upper end and a lower end, wherein said leg means are slideably disposed on the inside of said cylinders and wherein said upper end of said leg means forms on air tight connection between said inside of said cylinder and said upper end of said leg means and wherein said leg means telescopes in and out of said cylinder, said leg means are further curved to further conform to said curve of said cylinder, to allow said leg means to move inside of said cylinders;



a pump, said pump is disposed on said wheel chair;

tubes, said tubes essentially connecting said pump to said cylinders; wherein said pump is actuated by said disabled person while said disabled person is supported on said wheel chair, said pump thereby forms air under pressure into said tubes, and said air under pressure is conducted through said tubes and into said cylinders, thereby increasing the pressure within said cylinders which further reacts on said leg means actuating said leg means to further extend from said cylinder, thereby causing said wheel chair supporting said disabled person to elevate.

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TANDEM BABY CARRIAGE WITH FACING SEATS

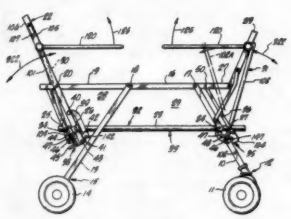
David T. Yee, Hacienda Heights; Eric Lin, Alhambra, and Fang-Tung Yee, Hawthorne, all of Calif., assignors to A B Oriental Trading Company, Inc., Los Angeles, Calif.

Continuation-in-part of Ser. No. 113,260, Oct. 26, 1987. This application Mar. 31, 1988, Ser. No. 175,866

The portion of the term of this patent subsequent to Aug. 22, 2006, has been disclaimed.

Int. Cl.[4] B62B *7/08*

U.S. Cl. 280—643 **18 Claims**



1. A foldable face-to-face tandem baby carriage comprising

a pair of front legs having wheels mounted at the lower ends, a pair of rear legs having wheels mounted at the lower ends, a first pair of parallel bars extending between each respective front leg and rear leg and pivotally mounted near the upper ends of the respective front leg and rear leg, a second pair of lower parallel bars extending between each respective front leg and rear leg and pivotally mounted between the top and the bottom of the front leg, the second pair of parallel bars being substantially parallel with the first pair of bars, a substantially U-shaped push handle, said push handle having free ends, said free ends of the handle being pivotally connected near the ends of the second pair of bars remote from the front legs, a lock between the rear legs and the push handle, a transverse foot bar pivotally extending between the rear legs and operable for disengaging the lock to thereby permit folding of said carriage a tandem pair of seats and backrests pivotally extending between the pairs of bars and forming said face to face seating, the backrests being pivotally collapsible relative to the seats about a transverse pivot, such that in an extended operational position the first and second parallel bars are substantially horizontal, and in a folded position the legs fold towards each other, the first and second pairs of parallel bars fold together, and the backrests fold downwardly towards the respective seats between the folded parallel bars, and wherein the seating of the tandem pair of seats and backrests face each other in the operational position.

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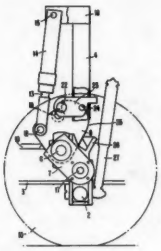
DEVICE MAKING IT POSSIBLE TO LOWER THE REAR OF A ROAD VEHICLE TO BRING IT TO GROUND LEVEL

Andre Pourchon, Ecully, and Dominique Guinamard, Lozzane, both of France, assignors to Societe Industrielle de Prefabrication Electrique, Lozanne, France

Filed Nov. 30, 1988, Ser. No. 278,108
Claims priority, application France, Nov. 30, 1987, 87 16927
Int. Cl.[4] B60G *25/00*
U.S. Cl. 280—704 **8 Claims**



1. A device making it possible to lower a rear end of a road vehicle to bring the rear end to ground level, comprising:
- an approximately vertical beam disposed at each end of rear axles of the vehicle, said beam having a lower end fastened to the axle;
- a shaft mounted, via a bearing, so as to pass through said beam, oriented parallel to the axle;
- a first arm fastened on an outside end of said shaft having a steering knuckle and wheel hub unit mounted thereon;
- a second arm fastened to an inside end of said shaft and equipped with locking means for locking the vehicle in a road position, support means supporting the vehicle on a frame in a lowered position and a rod of a cylinder having an end pivoted, a pivot pin connected to said second arm close to an upper end of said beam;
- said shaft carrying the two arms and the pivot pin of cylinder on said second arm being offset lengthwise relative to a wheel axis.

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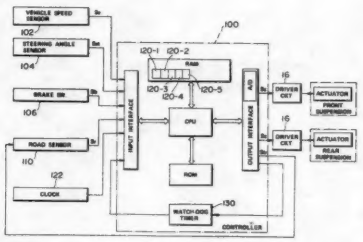
FAIL-SAFE SYSTEM FOR AUTOMOTIVE SUSPENSION CONTROL SYSTEM

Mitsuyuki Okamoto, Ischara, Japan, assignor to Nissan Motor Company, Limited, Yokohama, Japan

Continuation of Ser. No. 740,988, Jun. 4, 1985, abandoned. This application Nov. 2, 1987, Ser. No. 117,411
Claims priority, application Japan, Jun. 6, 1984, 59-115740
Int. Cl.[4] B60G *17/00*
U.S. Cl. 280—707 **39 Claims**



1. A suspension control system comprising:
- front and rear vehicle suspension systems, each being operable to assume various mode positions producing different damping characteristics;
- a sensor for detecting a preselected vehicle driving condition and producing a sensor signal indicative thereof;
- a controller responsive to said sensor signal for deriving independent front and rear suspension control signals indicative of one of said mode positions and outputting said control signals to said front and rear suspension systems to order said front and rear suspension systems to assume the indicated mode position, said controller checking its own operation and that of said sensor to determine a malfunction and performing a fail-safe control operation in which said controller orders one of said front and rear suspension systems to assume a stiffer-damping-characteristics mode position relative to the other regardless of the output of said sensor in order to increase under-steering characteristics when said malfunction of one of said controller and said sensor is detected.

4,886,292

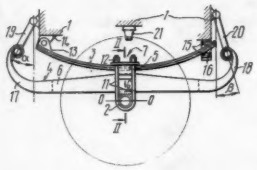
ELASTIC SUSPENSION OF A WHEELED VEHICLE

Ramil A. Azamatov, Brezhnev; Mikhail N. Zamitter, Kiev; Evgeny M. Zema, Sinelnikovo; Vladimir A. Nedorezov, Sinelnikovo, and Anatoly K. Oblovatsky, Sinelnikovo, all of U.S.S.R., assignors to Kievsky Inzhenerno-Stroitelny Institut, Kiev, U.S.S.R.

PCT No. PCT/SU86/00123, § 371 Date Jul. 25, 1988, § 102(e) Date Jul. 25, 1988, PCT Pub. No. WO88/03880, PCT Pub. Date Jun. 2, 1988
PCT Filed Nov. 28, 1986, Ser. No. 241,977
Int. Cl.[4] B60G *5/00, 11/04*
U.S. Cl. 280—718 **6 Claims**

1. An elastic suspension of a wheeled vehicle comprising a frame with at least one axle including a lamination of springs interposed between the frame and axle and mechanically connected thereto, a plate brace-like spring (4) extending length-

wise of the leaf spring lamination (3), and a fastening assembly (7) by means of which the springs of the leaf spring lamination



(3) and the plate brace-like spring (4) are mechanically interconnected at their midportions (5,6).

4,886,293

GAS PRODUCER FOR FILLING A GAS CUSHION RESTRAINING DEVICE

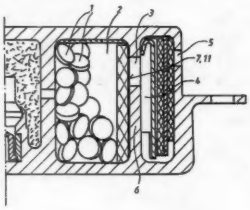
Werner Weiler, Lichtenwald, and Helmut Patzelt, Kernen-Stetten, both of Fed. Rep. of Germany, assignors to Daimler-Benz AG, Stuttgart, Fed. Rep. of Germany

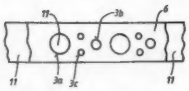
Filed Dec. 28, 1988, Ser. No. 291,173

Claims priority, application Fed. Rep. of Germany, Aug. 9, 1988, 3826960; Sep. 17, 1988, 3831641

Int. Cl.[4] B60R *21/26*

U.S. Cl. 280—736 **8 Claims**





1. Gas producer for filling a gas cushion restraining device for occupants of vehicles, having a combustion chamber filled with fuel and surrounded by a wall which exhibits apertures for the discharge of the gas produced, said apertures being sealed hermetically by a destructible cover at the start of the burning process of the fuel up to a specific pressure rise in the combustion chamber, wherein the total cross-sectional area of the discharge apertures is automatically enlargeable as a function of the rising combustion chamber pressure.

4,886,294

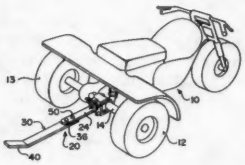
ANTI-TIP DEVICE FOR A VEHICLE

Vladimir W. Nahachewski, 1073 Mt. Baldur Drive, Vernon, British Columbia, V1B 2N8, Canada

Filed May 12, 1988, Ser. No. 193,503

Int. Cl.[4] B60R *21/00*

U.S. Cl. 280—755 **13 Claims**



1. An anti-tip device for a vehicle having a pair of rear wheels and at least one front wheel, the device comprising:

(a) a first member having means for connecting the device to the rear of the vehicle, a hitch means being connected to the means for connecting, for connecting a trailer to the vehicle; and

(b) a second member having a first end and a second end, the first end of the second member being pivotally connected to the first member for pivotting about a generally vertical axis when the vehicle is level so the second member extends rearwardly from the first member in a first position to prevent tipping of the vehicle and so the second member can be pivotted to a storage position generally perpendicular to the first position.

4,886,295

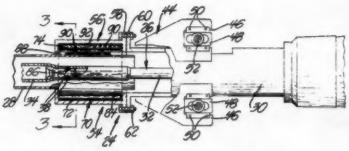
VEHICLE OCCUPANT PROTECTION SYSTEM

Alan L. Browne, Grosse Pointe, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed Dec. 5, 1988, Ser. No. 279,733

Int. Cl.[4] B62D *1/18*

U.S. Cl. 280—777 **4 Claims**



1. In a vehicle having a passenger compartment,

an actively variable occupant protection system comprising:

a first member in said passenger compartment stationary relative thereto,

a second member in said passenger compartment movable relative to said first member through a maximum working stroke from an extended position to a retracted position,

an energy absorbing means disposed between said first and said second members and operative in response to movement of said second member from said extended position toward said retracted position to develop a force resisting said movement,

resisting force adjusting means in said energy absorbing means operative to vary the magnitude of said resisting force, and

control means on said vehicle for said resisting force adjusting means including a plurality of sensors for determining instantaneous operating parameters characteristic of the kinetic energy of an occupant in said passenger compartment and operative to regulate said resisting force adjust-

ing means as a function of said instantaneous operating paramenters so that the energy absorbing capacity of said energy absorbing means through said maximum working stroke between said first and said second members corresponds generally to the kinetic energy of said occupant.

4,886,296

BELT FORCE LIMITING DEVICE

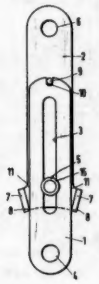
Peter Brodmann, Brunswick, Fed. Rep. of Germany, assignor to Volkswagen AG, Wolfsburg, Fed. Rep. of Germany

Filed Aug. 23, 1988, Ser. No. 235,947

Claims priority, application Fed. Rep. of Germany, Sep. 25, 1987, 3732298

Int. Cl.[4] B60R *22/28, 22/00*

U.S. Cl. 280—805 **6 Claims**



1. A device for limiting the belt forces generated in cases of restraint in safety belts of vehicles comprising a band-shaped component provided with a longitudinal slot, a support body with a bolt-shaped widening body engaged in the longitudinal slot, the widening body being wider than the width of the slot so that, if a predetermined belt force is exceeded, relative displacement between the band-shaped component and the widening body will occur, causing widening of the component, and a shaping body arranged to act on the outer longitudinal sides of said component to restore its shape following widening.

4,886,297

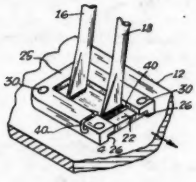
SKATEBOARD HANDLE

Norman Levine, 2205 NW 30th Pl., Pompano Beach, Fla. 33060

Filed Aug. 30, 1962, Ser. No. 238,622

Int. Cl.[4] A63C *17/14*

U.S. Cl. 280—809 **2 Claims**



1. A skateboard safety handle means for being grasped by a skateboard rider, comprising:

generally upright handle stem means;

base means connectable to the standard bolt pattern of a skateboard;

intermediate member means for releasable connection of said upright handle stem means to said base means;

removable fastener means for releasably connecting said intermediate member means to said base means;

wherein said intermediate member means is adaptable for sliding engagement within a pair of opposed grooves disposed in said base means, said intermediate member means being rigidly connected to said handle stem, and further comprising fastening pin means releasably connectable to said base means and to said intermediate member means for holding said intermediate member means in positive association with said base means;

said base means in U-shaped having a pair of opposed generally L-shaped side wall portions defining said grooves;

said grooves being equally spaced apart and downwardly and inwardly facing;

said grooves being adaptable to engage said intermediate member means in sliding engagement;

said base means also having an intermediate member acting as a rear stop against sliding motion of said intermediate member means;

said removable fastener means being a quick-release retaining pin means;

said quick-release retaining pin means is comprised of a single strand of resilient metal or plastic having a U-shaped bend, a first leg portion of said retaining pin means being positionable through aligned apertures disposed in the respective side wall portions of said U-shaped base means, a second leg portion of said retaining pin means being comprised of an L-shaped member, said L-shaped member having an upper segment extending generally parallel to the first leg portion and a lower base segment extending transversely to and away from a plane formed by said first leg portion and said upper segment;

wherein said upper segment of said retaining pin means is adapted to engage in mating relation with a corresponding groove disposed in the upper surface of one of said side wall portions and with said lower base segment of said L-shaped member engaging an inner surface of said one side wall portion when said first leg portion is positioned within said aligned apertures.

4,886,298

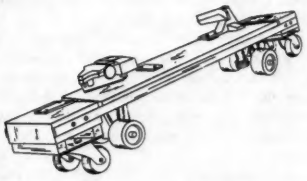
ROLLER SKI

Christopher B. Shols, 3700 Lillick Dr., #315, Santa Clara, Calif. 95051

Filed Nov. 30, 1987, Ser. No. 126,584

Int. Cl.[4] A63C *1/00*

U.S. Cl. 280—842 **12 Claims**



1. A roller ski for simulating the balance and motion of a conventional snow ski while skiing on a ground surface, the roller ski comprising:

a platform having a longitudinal axis;

a binding mounted on the platform for securing a skier's foot to the ski;

a frame having a longitudinal axis substantially aligned with the longitudinal axis of the platform, a front portion disposed in front of the binding and a rear portion disposed behind the binding;

a support rod for pivotally coupling the platform to the frame, the support rod disposed along the aligned longitudinal axes of the platform and frame, said support rod having distal and proximal ends;

a multiplicity of pivoting rollers for engaging the ground surface, the rollers being pivotally mounted to a bottom surface of the frame and arranged about the binding with a first pair of side-by-side rollers being attached to the front portion of the frame and a second pair of side-by-side rollers being attached to the rear portion of the frame to provide a stable support during use; and

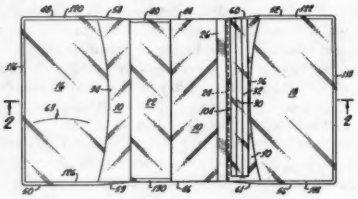
a turning wheel mounted to a bottom surface of the platform, the turning wheel being sized such that the turning wheel does not contact the ground surface when the frame and the platform are substantially co-planar, whereby the skier can pivot the platform relative to the frame about the support rod to cause the turning wheel to contact the ground surface by shifting body weight.

4,886,299

BOOK COVER

Gerard M. Ducorday, 10871 Thorley Rd., Santa Ana, Calif. 92705

Filed Jan. 3, 1989, Ser. No. 293,753
Int. Cl.[4] B42D *3/00*
U.S. Cl. 281—31 **26 Claims**



11. A book protective cover for removable attachment to and detachment from a book having front and back covers, a spine and a number of bound pages, said protective cover comprising:

an outside panel having front and back side edges and top and bottom edges, said panel having a front cover portion, a back cover portion and an intermediate spine portion between the front and back cover portions,

a front pocket panel secured to the front cover portion at front, top and bottom edges to define a front pocket for receiving the front cover of a book, and having a height between said top and bottom edges sufficient to accommodate a back cover of a book, and

a back pocket panel secured to the back cover portion to define a back pocket for receiving the back cover of a book, and said outside panel having a reduced height at said intermediate spine portion that is less than the height of said front and back pocket panels and less than the height of said outside panel at said front and back cover portion.

26. A plastic receptacle for a flat sheet like article having rectangular corners comprising:

a first panel having first and second side edges and top and bottom edges and having a plurality of panel corners,

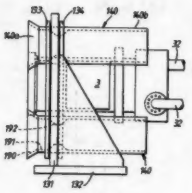
a pocket panel secured to the first panel to cooperate therewith to define a pocket for receiving a flat sheet like article, said pocket panel being secured to said first panel by weld seams extending along said first and second side edges and top and bottom edges, said weld seams forming seam corners at said panel corners, at least some of said seam corners having inner and outer boundaries, said outer boundary having an outer radius of curvature, said inner boundary having an inner radius of curvature substantially less than said outer radius of curvature and forming a sharp, rectangular inner seam corner.

4,886,300

IMPROVEMENTS IN AND RELATING TO CONNECTION ASSEMBLIES AND COMPONENTS THEREOF

Michael W. Spiering, Aberdeen, and Michael T. Cunningham, Udny Green, both of Scotland, assignors to Hunting Oilfield Services Limited, Aberdeen, Scotland

Filed Aug. 10, 1988, Ser. No. 230,372
Claims priority, application United Kingdom, Aug. 12, 1987, 8719074
Int. Cl.[4] F16L *35/00*
U.S. Cl. 285—26 **30 Claims**



1. In combination with a first hub which defines an axis and which has a first end face and a plurality of first fluid lines that extend to said first end face in a first pattern, and a second hub which defines an axis and which has a second end face and a plurality a second fluid lines that extend to said second end face in a second pattern, said second pattern being a mirror image of said first pattern, an apparatus for connecting said first hub and said second hub such that said axes thereof will be coaxial and said first and second end faces will be oriented such that said first and second patterns will be in register and said first fluid lines can communicate with said second fluid lines, said apparatus comprising

a plurality of first engagement members,

first mounting means for fixedly mounting said first engagement members around said axis of said first hub in a third pattern,

a plurality of second engagement members,

second mounting means for movably mounting said second engagement members around said axis of said second hub in a fourth pattern, said fourth pattern being a mirror image of said third pattern, said second engagement members being movable in the direction of said axis of said second hub from a retracted position to an extended position where they are engageable with said first engagement members, thereby causing said first and second hubs to become oriented such that said first and second patterns will be in register and said first and second fluid lines will be aligned with each other,

means for moving said second engagement members between their retracted and extended positions, and

latch means for latching said engaged first and second engagement members together so that movement of said second engagement members towards said retracted position will cause said first and second hubs to become juxtaposed.

4,886,301

QUICK DISCONNECT WITH A POSITION COMPENSATING SEAL

Ralph Remsburg, Irvine, Calif., assignor to Preece Incorporated, Irvine, Calif.

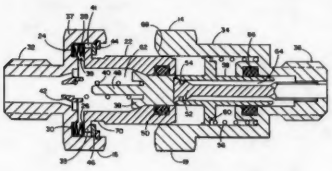
Filed May 5, 1988, Ser. No. 190,335
Int. Cl.[4] F16L *35/00*
U.S. Cl. 285—39 **6 Claims**

1. An improved quick disconnect of the type having a female coupler and a male nipple for non-threaded compressively engaged interconnection to permit fluid flow therebetween,

the improvement permitting secure leak-proof connection between the coupler and the nipple despite initial misalignment of their respective axes, the improvement comprising:

a nipple providing a wrench portion having an oversize annular chamber and having a nipple body providing a flanged portion positioned for radial, angular and axial movement within said annular chamber; and

a seal positioned within said annular chamber between said



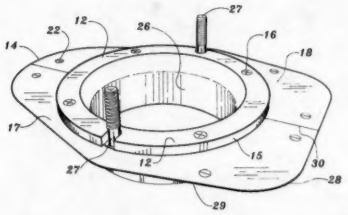
wrench portion and said flanged portion of said nipple body, said seal having a ring-shaped retainer of resilient flexible material and forming an annular pocket, said seal also having a plurality of Belleville-type springs coaxially positioned within said annular pocket whereby a sealing relationship is provided between said nipple body and said wrench portion despite radial, angular or axial movement of said nipple body to accommodate said initial misalignment.

4,886,302

REPAIR FLANGE

Chritopher B. Forbes, 2900 Misty Plum Ct., Fort Mill, S.C.

Filed Jul. 25, 1988, Ser. No. 223,925
Int. Cl.[4] F16L *55/00*
U.S. Cl. 285—56 **8 Claims**



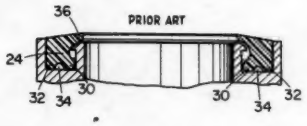
1. In combination with the closet flange and floor surface supporting a toilet bowl base thereon such as commonly found in bathrooms, a repair flange anchored to the floor and secured to the underside of the attachment rim of the closet flange and being an integral part of the closet flange so as to extend the anchoring surface of the closet flange over a larger area of the finished floor surface that exists under the toilet bowl base and received over the gaps in deteriorated and poorly cut floor openings underneath the attachment rim of the closet flange, said repair flange comprising a substantially rigid and flat sheet material flange member of predetermined shape having outer, peripheral edge portions which include front, back, and side edges, said front, back, and side edges being dimensioned so that said flange member is contained within the base of the toilet bowl, said flange member also including inner edge portions defining a substantially circular opening located substantially medially between respective outer, peripheral edges, said inner edge portions surrounding in close relationship thereto the neck of a closet flange underneath the attachment rim of said closet flange, means engaging said flange member and underlying floor surface to secure said flange member to said underlying floor surface, and means engaging the attachment rim of said closet flange and flange member to secure the flange member to said closet flange.

4,886,303

COUPLING WITH IMPROVED ELASTOMERIC FACE SEAL

Forrest L. Carson, and Kenneth M. Johnson, both of Borger, Tex., assignors to J. M. Huber Corporation, Rumson, N.J.

Filed Jul. 11, 1988, Ser. No. 217,203
Int. Cl.[4] F16L *17/03*
U.S. Cl. 285—99 **8 Claims**



1. A coupling including a pair of coupling bodies each adapted for sealing engagement with respective ends of a fluid line at an axially outward end of the coupling body and having a central passageway for fluid-tight tight transmission of fluid between and mated coupling bodies, the coupling further including locking means to secure the coupling bodies axially together in a coupled position and for releasing the coupling bodies to an axially separated uncoupled position, and an elastomeric annular seal housed in a sealing end of each coupling body for sealing engagement with its respective coupling body and with the other seal when the coupling bodies are mated together, the coupling further comprising:

each coupling body having an annular recess in the sealing end of each coupling body defined by a recess base surface of the coupling body, an outer wall portion of the coupling body, and an open end;

an annular securing member extending radially inward from the outer wall portion of the coupling body and having an end surface for engagement with the annular seal; and

the annular seal having a preselected thickness and being configured to fit within the annular recess, and having a cross-sectional configuration which defines:

(a) a tapered upper surface projecting radially inward and axially from its respective coupling body at an angle of from 13° to 17° with respect to a radial planar surface for sealing engagement with the tapered upper surface of the other seal when the coupling is mated;

(b) a radially inward concave surface having a selected radius of curvature with its center positioned radially inward thereof and having a ratio between the radius of curvature and the thickness of the annular seal which establishes a compression factor of 80–92%; and

(c) a radially outward projection positioned adjacent the outer wall portion and axially between the securing member and the base surface of the coupling body.

4,886,304

ABRASIVE GRIP PIPE COUPLING

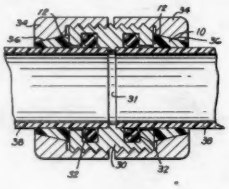
Donald R. Kunsman, Easton, Pa., assignor to Victaulic Company of America, Easton, Pa.

Continuation-in-part of Ser. No. 16,065, Feb. 18, 1987, abandoned. This application Dec. 2, 1988, Ser. No. 279,434
Int. Cl.[4] F16L *21/04*
U.S. Cl. 285—104 **21 Claims**

1. A reusable pipe coupling for pipe formed from a ductile material, of the type including a sleeve member, at least one sealing member contained within the sleeve member and for sealing engagement with an exterior surface of a pipe, an assembly of wedging members contained within the coupling, each wedging member having an axially directed camming surface on a radially outwardly presented surface thereof, and a camming ring movable axially with respect to said sleeve

member, and having a camming surface complimentary to and coacting with said camming surface of each said wedging member for camming said wedging members radially inwardly upon axial movement of said camming ring in an appropriate direction; further including:

particles of grit material on an axially directed radially inwardly presented surface of each each said wedging member for biting engagement with said exterior surface of said pipe; said wedging members each being formed of a



ductile material, and said particles of grit material being of a hardness greater than the hardness of said pipe and said wedging members;

whereby said particles will matrix themselves within the respective mutually presented surfaces of said pipe and said wedging members to provide an interconnection between said respective pipe and wedging members of enhanced resistance to axial and circumferential shear forces at the interface between said pipe and said wedging members.

4,886,305

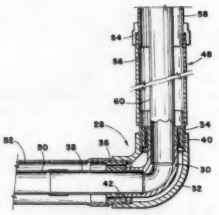
DOUBLE CONTAINMENT PIPE FITTINGS AND APPARATUS TO ADHESIVELY INSTALL THE SAME

Carl E. Martin, Sand Springs, Okla., assignor to Fibercast Company, Sand Springs, Okla.

Filed Aug. 12, 1988, Ser. No. 231,361

Int. Cl.[4] F16L *39/00*

U.S. Cl. 85—133.1 **11 Claims**



1. A double containment pipe fitting made of fiber reinforced vinyl ester resin comprising:

(a) an outer containment housing with a plurality of open ends wherein the internal diameter of each of said open ends are sized such as to accept and adhesively bond to segments of external containment pipe;

(b) an inner carrier housing with a plurality of open ends adapted to insert within and coaxially align with said outer containment housing and wherein said plurality of open ends of said inner carrier housing are sized such as to accept and adhesively bond to segments of inner carrier pipe when positioned coaxial to external containment pipe;

(c) a plurality of external containment pipe segments adhesively bonded to each of said plurality of open ends of said outer containment housing; and

(d) a plurality of rigid centering ring means, one for each of said plurality of external containment pipe segments, said ring means being adhesively bonded to said outer containment housing and one of said external containment pipes and said inner carrier housing, and for adhesively bonding to an inner carrier pipe, thus producing a restraint fitting.

8. A double containment pipe fitting of claim 7 further comprising at least one inner carrier pipe segment adhesively bonded to one of said plurality of open ends of said inner carrier housing.

4,886,306

STARTER

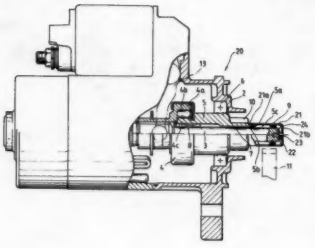
Toshinori Tanaka; Shuzoo Isozumi, and Keiichi Konishi, all of Hyogo, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 31, 1988, Ser. No. 265,379

Claims priority, application Japan, Oct. 2, 1987, 62-168224; Nov. 6, 1987, 62-170613; Feb. 12, 1988, 63-31188

Int. Cl.[4] F02N *11/00*

U.S. Cl. 290—48 **8 Claims**



1. A starter of overhang type for starting an engine, comprising:

an electric motor having an armature rotary shaft for providing torque to start the engine;

a rotary output shaft extended forwardly from said armature rotary shaft in the axial direction thereof;

an overrunning clutch device mounted on said rotary output shaft and having a clutch outer;

a movable pinion cylinder having a clutch inner at a rear end portion thereof, a pinion to engage with a ring gear of the engine at a front end portion thereof, and a slidably supporting surface at a middle portion thereof, said movable pinion cylinder being slidably mounted on said rotary output shaft, said overrunning clutch device detachably connecting said rotary output shaft to said movable pinion cylinder through said clutch inner to transmit a rotary force of said rotary output shaft to said movable pinion cylinder;

a front frame for supporting said rotary output shaft through said movable pinion cylinder;

a bearing fitted in said front frame and slidably supported by said slidably supporting surface;

a bottomed cylindrical cap connected to the front end portion of said movable pinion cylinder for cover the front end of said rotary output shaft; and

inside pressure control means for controlling an inside pressure in said cap.

4,886,307

LOCK, PARTICULARLY FOR TRUNK OR ENGINE COMPARTMENTS OF AUTOMOTIVE VEHICLES, DOORS OR THE LIKE

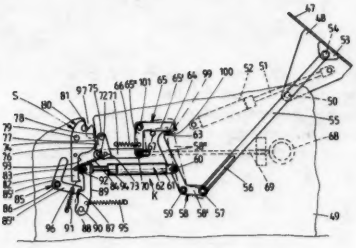
Edvard Rückert, Wülfrath, Fed. Rep. of Germany, assignor to Ewald Witte & Co., Velbert, Fed. Rep. of Germany

Filed Sep. 4, 1987, Ser. No. 94,463

Claims priority, application Fed. Rep. of Germany, Apr. 1, 1987, 3710844; May 21, 1987, 3717013

Int. Cl.[4] E05B *51/02*

U.S. Cl. 292—216 **11 Claims**



1. In a lock, particularly for a trunk, hatch, engine compartments of automotive vehicles, doors and the like, having a mating closure part adapted to be arranged on a hinged part and to be brought into a closed position by means of an external force, the improvement comprising:

means comprising a force accumulator which forms the external force is charged by displacement of said hinged part;

one end of said force accumulator cooperates with a lock part which grips the mating closure part, the other end of said force accumulator acting upon a swingably mounted charging lever adapted to be released before said force accumulator is charged; said lever is connected by means of a free path to a swing lever articulated to said hinged part, the free path being eliminated when said charging lever is in its release position;

said charging lever has two arms, one of said arms being connected by means of a pin and slot connection, thus forming said free path, to the swing lever, and the other of said arms being connected to one end of said force accumulator.

4,886,308

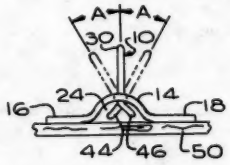
HASP FASTENER UNIT

Robert Bowman, 4611 Mediterranean, Wildwood, N.J. 08260

Filed Aug. 19, 1988, Ser. No. 234,272

Int. Cl.[4] E05C *19/08*

U.S. Cl. 292—281 **10 Claims**



1. A hasp fastener unit, comprising:

a keeper plate having a portion with an interior surface defining an open interior space, and having an eye member passage; and,

an eye member having a base portion adapted to be positioned in said open interior space, and having an outer end portion extending through said eye member passage and being pivotal within said eye member passage, said base portion comprising at least one slit defining at least two legs, said legs being bent relative to one another and to said outer end portion so as to prevent passage of the base portion through the eye member passage, and being adapted to abut said interior surface of said keeper plate to define a pivotal range of motion within said eye member passage.

4,886,309

LINK COUPLING ARRANGEMENT FOR VEHICLE DOOR LOCK ASSEMBLY

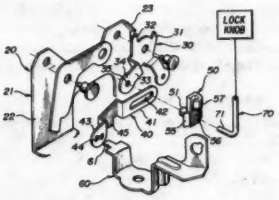
Ryoji Shimura, Yokohama, Japan, assignor to Ohi Seisakusho Co., Ltd., Kanagawa, Japan

Filed Dec. 17, 1987, Ser. No. 134,250

Claims priority, application Japan, Dec. 18, 1986, 61-194698

Int. Cl.[4] E05C *21/00*

U.S. Cl. 292—336.3 **7 Claims**



1. A link coupling arrangement for a vehicle door lock assembly, comprising a pair of transmission link members interlockably mounted together on a body of the vehicle door lock assembly,

a transmitting member for driving the pair of transmission members; and a coupler member for interlocking the transmission link members and transmitting member together, said coupler member including connecting means for connecting the transmission link members together by reception of the connecting means through the link members in a first direction and by reception of the transmitting member into the connecting means in said first direction.

4,886,310

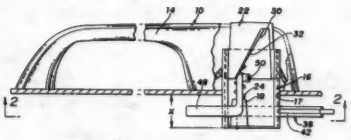
DOOR HANDLE FOR VEHICLE WITH FLUSH GLASS

Richard A. Cyr, Sterling Heights, and Ronald J. Raley, Rochester, both of Mich., assignors to General Motors Corporation, Detroit, Mich.

Filed Jun. 20, 1988, Ser. No. 209,235

Int. Cl.[4] E05B *1/00*

U.S. Cl. 292—336.3 **1 Claim**



1. A motor vehicle door handle assembly mounted on a door panel for operating a door latch comprising:

a handle mounted on the door panel;

a push button mounted on the handle for movement between an extended position projecting outside the door panel to be accessible to the vehicle user and a depressed position,

said push button having a cam surface formed on the interior thereof and being situated outside the door panel at least when the push button is in the extended position;

a door latch operating lever operably connected to the door latch and having a cam follower portion thereof extending outside the door panel and into the inside of the push button to engage with the cam surface of the push button;

pivot means pivotally mounting the operating lever for pivotal movement about an axis extending parallel to and laterally offset from the axis of movement of the push button so that the cam follower portion of the operating lever moves in a path normal to the axis of movement of the push button and remains outside of the door panel during pivotal movement of the operating lever by the interaction between the cam surface and the cam follower portion of the operating lever upon movement of the push button from the extended position to the depressed position; and

spring means acting to urge the pushbutton to the extended position.

4,886,311

GLOVE BOX, PARTICULARLY FOR MOTOR VEHICLES

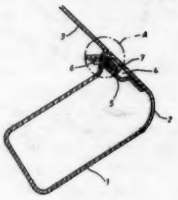
Hans Trube, Herrenberg; Jürgen Körber, Sindelfingen, and Santiago Ducnas, Rottwill, both of Fed. Rep. of Germany, assignors to Daimler-Benz Aktiengesellschaft, Fed. Rep. of Germany

Filed Nov. 23, 1988, Ser. No. 274,780

Claims priority, application Fed. Rep. of Germany, Nov. 25, 1987, 3739921

Int. Cl.[4] B60R *7/04*

U.S. Cl. 296—37.12 **6 Claims**



1. Glove box for motor vehicles, comprising:

a container;

a lid which is mounted pivotably about an axis on the container between an open and closed position;

said lid having an inner part forming a cavity constructed to house parts of a closing device, comprising:

a lock part fastened to an instrument panel of the vehicle;

a latch located in said lock part;

a latch bar lockingly cooperating with the latch;

said latch bar, arranged within a cavity in the lid;

a recess opening means in a lid inner part to permit introduction of the latch bar and a portion of the lock part into the cavity in the closed position of the lid.

4,886,312

AUTOMOBILE REAR BODY STRUCTURE

Seiiti Asoh, Higashihiroshima, Japan, assignor to Mazda Motor Corporation, Hiroshima, Japan

Filed Jan. 11, 1989, Ser. No. 295,792

Claims priority, application Japan, Jan. 11, 1988, 63-4400

Int. Cl.[4] B60J *1/18*; B62D *25/10*

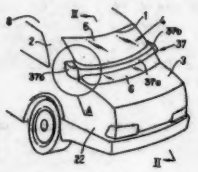
U.S. Cl. 296—76 **14 Claims**

1. An automobile rear body structure comprising:

a pair of rear pillars disposed on both sides of the rear body structure;

a rear header adapted to be rigidly secured to a roof panel and extending in a direction widthwise of an automobile vehicle;

an openable structure hingedly connected to said rear pillars for opening or closing a luggage space; and



a rear windshield glass separated into two at a predetermined height and comprising;

an upper glass portion secured to said rear pillars and to said roof panel reinforced by said rear header; and

a lower glass portion secured to said openable structure.

4,886,314

FRONT STRUCTURE FOR AUTOMOTIVE VEHICLES

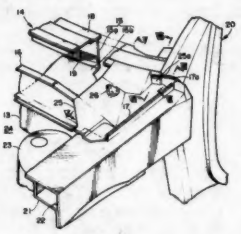
Ryoji Maeda, Zama, Japan, assignor to Nissan Motor Co., Ltd., Yokohama, Japan

Filed Jan. 31, 1989, Ser. No. 304,096

Claims priority, application Japan, Feb. 9, 1988, 63-28533; Feb. 10, 1988, 63-16680[U]

Int. Cl.[4] B62D *27/00*

U.S. Cl. 296—192 **8 Claims**



1. A front structure for an automotive vehicle, comprising:

a dash lower panel;

a pair of front pillars disposed at opposite lateral ends of said dash lower panel;

an air box extending along an upper end of said dash lower panel and secured to same, said air box being further secured at opposite lateral end portions thereof to said front pillars;

a pair of hood ledge means each secured at a rear end portion thereof to each lateral end portion of said air box and each front pillar; and

a pair of braces for preventing said hood ledge means from leaning toward an engine compartment of the vehicle, each disposed between each lateral end portion of said air box and each hood ledge means and secured to same;

each brace being further secured at a rear end portion thereof to each front pillar and integrally formed with a wiper pivot mounting portion.

4,886,315

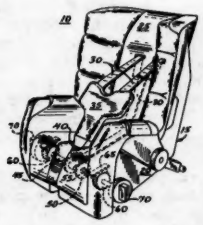
HARNESS ADJUSTING MECHANISM

Edward M. Johnson, Park Forest, Ill., assignor to Kolcraft Products, Inc., Chicago, Ill.

Filed Jul. 29, 1988, Ser. No. 225,930

Int. Cl.[4] A47D 1/10

U.S. Cl. 297—250 4 Claims



1. A child seat for use in a vehicle, said child seat having an adjustable retaining harness mechanism, comprising:

a child seat configured to receive a child mountable upon an automobile seat,

harness means positioned to releasably restrain a child in said child seat, said harness means having a first and a second end,

said first end of said harness means detachably affixed to said seat

manual tensioning and locking means to tension said second end of said harness means and to prevent further tensioning or loosening of said second end of said harness means;

said tensioning and locking means including a horizontally extending axle to which said second end of said harness means and a disengageable locking assembly are affixed; and

said axle being spring biased so as to maintain the locking assembly in releasably locking engagement.

4,886,316

LUMBAR SUPPORT DEVICE

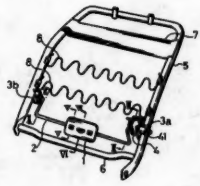
Tomio Suzuyama; Takayuki Kosaka; Masaki Hayama, and Tamotsu Shirai, all of Akishima, Japan, assignors to Tachi-S Co., Ltd., Tokyo, Japan

Filed Jun. 14, 1988, Ser. No. 206,367

Claims priority, application Japan, Jun. 30, 1987, 62-100645[U]

Int. Cl.[4] A47C 7/46

U.S. Cl. 297—284 7 Claims



1. A lumbar support device which is provided on a back frame of a seat back of a seat, comprising:

a support wire of a substantially inverted U-shaped configuration, which has a lumbar plate provided longitudinally and centrally thereof, said support wire being rotatably mounted on said back frame such that the support wire extends between both lateral bar sections of the back frame;

a pair of securing support members fixedly provided on said lateral bar sections of said back frame, said securing support members being so adapted that end portions of said support wire are respectively fitted in each of them; and

a cam means arranged adjacent to one of said pair of said securing support members, aid cam means being positioned so as to abut said support wire and adapted for causing upward and downward movement of said support wire by such abutment,

wherein a pair of securing portions are respectively formed at ends of said support wire, such that they are bent therefrom in a same direction,

wherein said one of said securing support members disposed at said cam means is formed with means defining a first securing opening which is formed in the securing support member so as to be open in a direction substantially perpendicular to a direction in which said support wire is moved upwardly and downwardly by said cam means,

wherein the other of said pair of said securing support members is formed with means defining a second securing opening which is formed in the other securing support member so as to open in a direction substantially perpendicular to the opening direction of said first securing opening, and

wherein said two securing portions of said support wire are respectively fitted in said two securing openings.

4,886,317

MOTOR VEHICLE SEAT ARM REST CONTROL

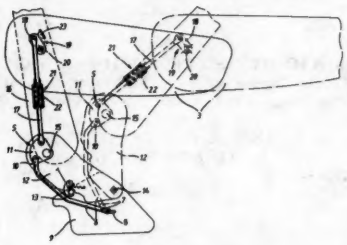
Rainer Konzmann; Otto Ohlhausen; Joachim Schmitt; Antonin Koucky, all of Sindelfingen, and Josef Klink, Nagold, all of Fed. Rep. of Germany, assignors to Daimler-Benz Aktiengesellschaft, Stuttgart, Fed. Rep. of Germany

Filed Oct. 11, 1988, Ser. No. 256,316

Claims priority, application Fed. Rep. of Germany, Oct. 8, 1987, 3734046

Int. Cl.[4] A47C 7/54

U.S. Cl. 297—417 2 Claims



1. Motor car seat having a variable-angle backrest and an arm support retained on a frame of said backrest; said arm support being foldable clockwise from a vertical erect non-use position into a horizontal lower use position; and wherein, while in the use position, an arm support control means essentially maintains the angular alignment of said arm support during the changing of the backrest inclination; wherein the arm support control means also guides the arm support above a shift lever arranged on a central console of the seat during the time the backrest is foldable forward;

wherein the arm support control means includes a first rod guided adjacent one end in a slot of a fixed mounting part and adjacent another end, the first rod is pivotably attached to a deviating member pivotably mounted on a second mounting part; said second mounting part being pivotally attached to said fixed mounting part and foldable forwards after release by a catch means which secures the mounting part against folding; and wherein a second rod is pivotably attached to the deviating member and to a lever

pivotally connected between the arm support and the frame to maintain said alignment of the arm support and for the guiding of the arm support above the shift lever.

4,886,318

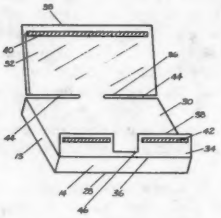
ATTACHMENT FOR A SAFTY BELT HARNESS

Betty D. Pennock, Apartment 902, 12141 Jasper Avenue, Edmonton, Alberta, Canada (T5N 3X8)

Filed Nov. 14, 1988, Ser. No. 270,738

Int. Cl.[4] B60R *21/00*

U.S. Cl. 297—482 **13 Claims**



1. An attachment for a safety belt harness, comprising:

an elongate body having a top face, a bottom face and longitudinal sides, the bottom face having a clinging surface such that the body adheres to a wearer, the top face having a slippery surface thereby permitting a safety belt harness to move longitudinally on the top surface, a longitudinal channel being provided to confine the safety belt harness against movement transverse to the top surface, the elongate body being made of foam with longitudinal slits on the top face of the body adjacent the sides, such that the pressure of the safety belt harness on the foam body defines the longitudinal channel and maintains the safety belt harness in contact with the elongate body.

4,886,319

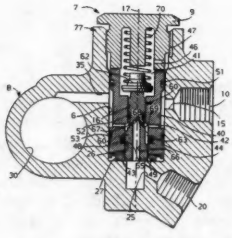
LOW HYSTERESIS PROPORTIONER VALVE

David L. Nies, Dayton, and Tomas L. Shroyer, Centerville, both of Ohio, assignors to General Motors Corporation, Detroit, Mich.

Filed Nov. 30, 1988, Ser. No. 277,804

Int. Cl.[4] B60T *13/00, 8/26*

U.S. Cl. 303—9.75 **8 Claims**



1. A two diameter vehicle brake master cylinder proportioning valve for supplying primary and secondary circuits with pressurized fluid from a master cylinder, said valve supplying both said circuits at generally the same pressure at lower fluid pressures and generally when said master cylinder pressure rises above a first predetermined pressure, said valve supplies fluid at an increased master cylinder pressure to said primary circuit and at a proportion of said increased master cylinder pressure to said secondary circuit, said valve in combination comprising:

a valve body having a main bore with a primary axis, said valve body adjacent an end of said main bore being fluidly connected with said secondary circuit, said main bore also being fluidly connected with said master cylinder and said primary circuit axially spaced from said fluid connection of said main bore with said secondary circuit;

first housing means fluidly sealing said main bore into first and second chambers, said first chamber being open to a vent and said second chamber being fluidly connected with said master cylinder and said primary circuit, said first housing means having a bore with a first diameter generally parallel with said main bore primary axis intersecting said first and second chambers;

second housing means dividing said main bore second chamber from said secondary circuit connection with said main bore, said second housing having a bore at a second diameter differing from said first diameter generally axially aligned with said bore in said first housing means;

means allowing fluid communication from said secondary circuit to said second chamber when the pressure within said secondary circuit exceeds the pressure within said second chamber;

a valve piston spring biased away from said first chamber slidably and sealably mounted within said bore of said first housing means and slidably mounted in said bore of said second housing means whereby when said brake cylinder pressure is increasing from a low value, said valve piston is held by said spring in an extreme position away from said first chamber and pressurized fluid freely slows between said master cylinder and said secondary circuit, and at an increase in master cylinder pressure past said first predetermined pressure, said valve piston moves towards said first chamber reaching a force balanced position metering pressurized fluid flowing from said master cylinder to said secondary circuit, and a lowering of said master cylinder pressure from a value above said first predetermined pressure causes said valve piston to move towards first chamber displacing fluid away from said secondary circuit and thereupon be returned by said spring to a position further away from said first chamber.

4,886,320

VITAL PRESSURE REGULATING SYSTEM FOR RAILROAD CARS

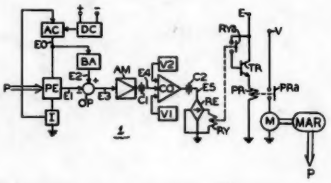
Asaji Imanaka, and Kazutaka Nagata, both of Kobe, Japan, assignors to Nippon Air Brake Co., Ltd., Kobe, Japan

Filed Aug. 15, 1988, Ser. No. 231,931

Claims priority, application Japan, Aug. 31, 1987, 62-133638[U]

Int. Cl.[4] B60T *13/18, 13/70*

U.S. Cl. 303—11 **1 Claim**



1. A pressure regulating system for railway vehicles in which the air pressure in a main air reservoir is monitored so that an air compressor is operated when the air pressure decreases and falls below a predetermined lower limit value, and so that the air compressor is shut off when the air pressure increases and exceeds a predetermined upper limit value comprising, a pressure sensor means for sensing the air pressure in

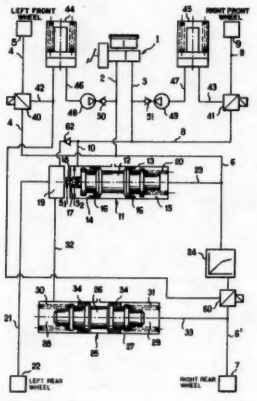
the main air reservoir and for converting the air pressure into a first alternating current signal wherein the absolute value of the alternating current signal becomes progressively greater in proportion to the air pressure, a bias signal generator means for producing a second constant alternating current signal in phase with the first alternating current signal, a summing operating circuit means for subtracting the first alternating current signal from the second constant alternating current signal and for producing a third alternating current signal wherein the absolute value of the third alternating current signal becomes progressively smaller and is inversely proportional to the air pressure, a comparator means receiving the third alternating current signal which has a first predetermined value which is equivalent to the predetermined upper limit value of the air pressure and has a second predetermined value which is equivalent to the predetermined lower limit value of the air pressure, the comparator means producing a fourth alternating current signal when the absolute value of the third signal increases and becomes progressively higher than the absolute value of the second predetermined value and produces a direct current signal when the absolute value of the third signal decreases and becomes progressively lower than the absolute value of the first predetermined value, and a switch which causes the air compressor to operate when the comparator means produces the alternating current signal, and which shuts off the air compressor when the comparator means produces a direct current signal.

4,886,321

HYDRAULIC CIRCUIT FOR A MOTOR VEHICLE

Marc De La Broise, Bagneux; Christian Tanguy, Frepillon, and Gilbert Kervagoret, Argenteuil, all of France, assignors to Bendix France, Drancy, France

Filed Dec. 7, 1988, Ser. No. 281,130
Claims priority, application France, Dec. 23, 1987, 87 17991
Int. Cl.[4] B60T *17/18*
U.S. Cl. 303—92 **9 Claims**



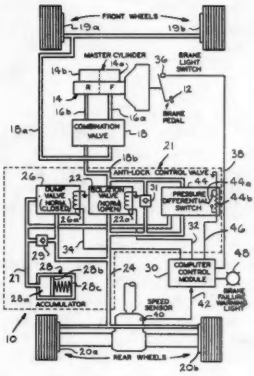
1. A hydraulic brake circuit for a motor vehicle, comprising:
a pressure generator for a brake fluid,
a primary circuit controlled by said generator to feed first and second brake motors associated respectively with first and second wheels which are mounted respectively on first and second axles and in one diagonal direction,
a secondary circuit controlled by the generator to feed a third brake motor associated with a third wheel mounted on the first axle in the other diagonal direction,
a fourth brake motor being associated with a fourth wheel mounted on the second axle in said other diagonal direction, said fourth brake motor being disconnected from fluid pressure in the secondary circuit during normal braking operation,
a balancing device for balancing pressures in the brake motors of the wheels of the second axle, said balancing device having a first chamber connected with the primary circuit and a second chamber connected with the fourth brake motor, and
a valve sensitive to fluid pressure in the primary circuit to connect the fourth brake motor to the secondary circuit in event of failure of the primary circuit.

4,886,322

VEHICLE ANTI-LOCK BRAKE SYSTEM

Thomas M. Atkins, Ann Arbor, Mich., assignor to Kelsey Hayes Company, Romulus, Mich.

Continuation-in-part of Ser. No. 63,361, Jun. 15, 1987, Pat. No. 4,790,607, which is a continuation-in-part of Ser. No. 702,765, Feb. 19, 1985, Pat. No. 4,673,226. This application Dec. 13, 1988, Ser. No. 283,360
Int. Cl.[4] B60T *8/66*
U.S. Cl. 303—109 **13 Claims**



1. In a wheeled vehicle having means for supplying pressurized brake fluid to actuate the associated wheel brakes of the vehicle, a brake control system for controlling the application of pressurized brake fluid to at least one selected wheel brake to control the braking of the associated wheel, said control system comprising:
a normally open isolation valve means connected between the supply means and the selected wheel brake;
a normally closed dump valve means connected between the selected wheel brake and a fluid reservoir; and
control means connected to operate said isolation valve means and said dump valve means, said control means including means for sensing the deceleration of the associated wheel and for detecting wheel speed departures of the associated wheel relative to the actual speed of the vehicle, said control means operable to close said isolation valve means to hold the fluid pressure to the selected wheel brake at a relatively constant level after a wheel speed departure of the associated wheel is detected, said control means operable to selectively open said dump valve means after said isolation valve means has been closed to enable fluid to flow into said fluid reservoir to selectively reduce pressure to the selected wheel brake and correct said wheel speed departure of the associated wheel, said control means operable to determine a reference deceleration value representing the average wheel deceleration during a cycle of said wheel speed departure, said control means further operable to reapply additional pressure to the selected brake in the event the actual

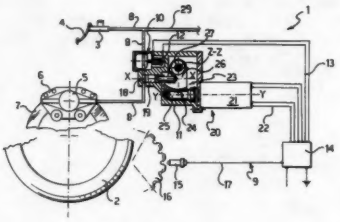
average wheel deceleration over a predetermined time period following said cycle is greater than said reference deceleration value by a predetermined amount.

4,886,323

ANTISKID DEVICE USEFUL IN A BRAKE SYSTEM OF A MOTORVEHICLE

Alberto Giorgetti, Terno d'Isola, and Roberto Lavezzi, Brembate Sopra, both of Italy, assignors to Brembo S.p.A., Paladina, Italy

Filed Mar. 7, 1988, Ser. No. 164,566
Claims priority, application Italy, Mar. 9, 1987, 19629 A/87
Int. Cl.[4] B60T *8/42*
U.S. Cl. 303—113 **2 Claims**



1. An antiskid device in a braking system having a master cylinder, a braking cylinder, a line connected to the cylinders for conveying braking fluid therebetween, an on-off valve in the line which isolates the braking cylinder from the master cylinder when the valve is actuated to its on position, comprising:

(a) a chamber in communication with the line, downstream of the on-off valve, and having a moveable piston therein;

(b) an electric motor connected to said piston by an irreversible linkage pair wherein said pair transmits only the movement of the motor to the piston;

(c) a control means operatively connected to said motor for controlling the movement of said motor in response to skidding; and

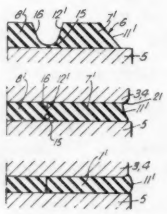
(d) a sensing means operatively connected to said control means for generating and transmitting a signal to said control means in response to skidding.

4,886,324

BUSH ASSEMBLY FOR TRACK OF TRACKED VEHICLE

Donald M. Turner, Bath, Avon, United Kingdom, assignor to Avon Rubber PLC, England

Filed Aug. 9, 1988, Ser. No. 230,239
Claims priority, application United Kingdom, Aug. 10, 1987, 8718899
Int. Cl.[4] B62D *55/215*
U.S. Cl. 305—42 **4 Claims**



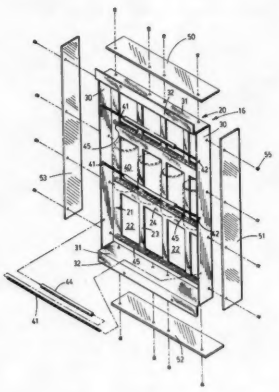
1. A bush assembly for a housing of a track part of a tracked vehicle, said housing having an inner wall, said assembly comprising a rigid central pin and a bush of resilient material, said pin having an outer surface; said bush having a radially innermost surface in contact with and bonded to said outer surface of said pin and a radially outermost surface spaced from said radially innermost surface, said radially outermost surface for being in contact with said inner wall of said housing for precompressing said bush between said outer surface of said pin and said inner wall of said housing; said bush comprising a plurality of annular bush parts disposed axially along said outer surface of said pin, an axially outermost bush part having a first side wall for being positioned adjacent an end of the housing and a second side wall on a side of said bush axially remote from said first side wall, wherein, when in a relaxed, non-compressed condition, the length of said first side wall between said inner wall of said housing and said outer surface of said pin is greater than the length of said second side wall.

4,886,325

DISPLAY ASSEMBLY FOR AUTOMATIC CAN VENDING MACHINE

Donald C. Rockola, Chicago, and Shuja Hague, Northbrook, both of Ill., assignors to Rock-Ola Mfg. Corporation, Addison, Ill.

Filed Sep. 16, 1988, Ser. No. 245,735
Int. Cl.[4] A47F *3/00*
U.S. Cl. 312—138.1 **7 Claims**



1. An article display assembly, for use in coin-operated vending machines having an upright cabinet equipped with a front door and article selection means, comprising:

a planar display panel having a plurality of display openings therein closely receptive of articles to be displayed;

means for retaining said articles in display position in said openings so that only portions thereof protrude from one face of said panel;

means for mounting said panel within the interior of the cabinet door so that said portions of said articles mounted thereon are visibly displayed opposite a display window in the door's front panel, and

artificial light means mounted within the door's interior and located outwardly adjacent said means for mounting said panel whereby to illuminate the displayed portions of said articles.

4,886,326

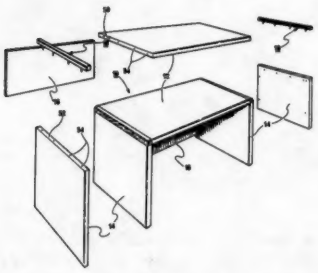
INTERLOCK SYSTEM FOR READY TO ASSEMBLE FURNITURE, AND FURNITURE INCORPORATING SUCH SYSTEM

Andrew Kuzyk, Carleton Place, Ontario, Canada, assignor to Tetrad Marketing/Sales Ltd., Ontario, Canada

Filed Apr. 21, 1988, Ser. No. 184,247

Int. Cl.[4] A47B *43/00*

U.S. Cl. 312—257.1 **9 Claims**



1. An interlock for securing adjacent panels of ready to assemble furniture in a selected angular relationship, which panels include opposed major panel surfaces and minor panel end faces transverse to said major panel surfaces, said interlock comprising:

a rigid elongated core member including a pair of elongated faces thereon disposed in a predetermined angular relationship to one another with each of said elongated faces extending lengthwise of the elongated core member;

a plurality of connecting devices fixed relative to said core member and projecting outwardly from each of said elongated faces in predetermined spaced apart relation to each other along the lengthwise extents of each of said elongated faces, said connecting devices adapted to enter into correspondingly spaced apart bores in the minor end faces of the panels which are to be secured;

said connecting devices each having means thereon for engaging, in use, with locking elements disposed in the respective bores in the minor end faces of the panels whereby the connecting devices may, in use, be securely held in said bores with said elongated faces of the core member in close abutting relation to the respectively associated minor end faces of the panels, and wherein

said elongated faces of the core member each comprise an elongated substantially planar surface with said pair of elongated planar surfaces being substantially at right angles to each other and said connecting devices projecting outwardly substantially at right angles to said elongated planar surfaces with which said connecting devices are respectively associated.

4,886,327

LIGHTED DISPLAY CASE

Douglas D. Amstutz, Muskegon, and Ronald A. Vanderboegh, Twin Lakes, both of Mich., assignors to Amstore Corporation, Muskegon, Mich.

Filed Feb. 29, 1988, Ser. No. 161,902

Int. Cl.[4] A47B *43/00*

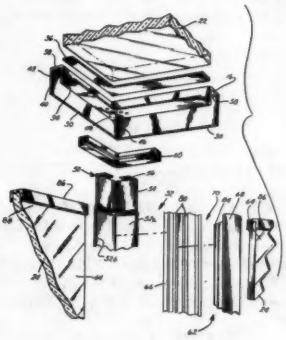
U.S. Cl. 312—257.1 **6 Claims**

1. An improved display case having a base, a frame supported on said base, and glass panels supported within said frame, wherein the improvement comprises said frame comprising:

an upper horizontal frame uniform in cross section and defining a downwardly opening channel;

a plurality of vertical corner members supporting said horizontal frame above said base, each corner member including an upper end fitted within said channel; and

wedge means for securing said upper ends of said vertical



members within said channel of said horizontal frame, said wedge means being force-fitted within said channel to force said upper end of said corner member into engagement with said upper frame.

4,886,328

DISPLAY APPARATUS FOR VEHICLE WITH MEANS TO PREVENT SOLAR HEATING THEREOF

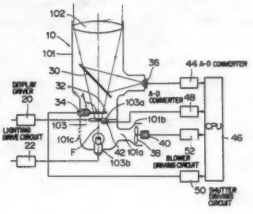
Tadashi Iino, Susono, Japan, assignor to Yazaki Corporation, Tokyo, Japan

Filed May 27, 1986, Ser. No. 866,714

Claims priority, application Japan, Sep. 11, 1985, 60-138013[U]; Oct. 25, 1985, 60-162965[U]; Feb. 19, 1986, 61-21554[U]; Mar. 12, 1986, 61-34577[U]; Mar. 31, 1986, 61-46112[U]

Int. Cl.[4] G09G *3/02*

U.S. Cl. 340—980 **12 Claims**



1. A display apparatus for displaying a display image on a windshield of a vehicle, comprising:

a display means for displaying information;

converging lens means for projecting a display image of said display means on said windshield of said vehicle, said converging lens means having a focus within which said display means is located and being positioned between said windshield and said display device;

light detecting means for detecting an intensity of external light entering through said converging lens means from the side thereof opposite to said display means, said light detecting means being disposed between said converging lens means and said display means; and

light intercepting means positioned between said converging lens means and said display means for moving at a displacement between a first position in which external light entering through said converging lens means is prevented from being directed to said display device when said

display means is an inoperative condition and when said light detected by said detecting means has an intensity higher than a predetermined level, and a second position in which said external light is directed to said display device when said external light detected by said light detecting means has an intensity lower than said predetermined level.

4,886,329

OPTICAL SCANNING DEVICE AS WELL AS A MICROFILM READER-PRINTER WITH SUCH A DEVICE

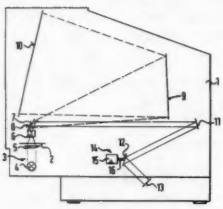
Peter Dziemba, Bad Nauheim, Fed. Rep. of Germany, assignor to MAP Mikrofilm Apparatebau, Dr. Poehler GmbH & Co. KG, Ober-Morlen, Fed. Rep. of Germany

Continuation-in-part of Ser. No. 91,164, Aug. 31, 1987, abandoned. This application Oct. 19, 1987, Ser. No. 109,534

Claims priority, application Fed. Rep. of Germany, Sep. 1, 1986, 3629725

Int. Cl.[4] G02B *26/00*; G03B *27/16*

U.S. Cl. 350—6.5 10 Claims



1. An optical scanning device, comprising: a controllably pivotable first deflecting mirror disposed behind a lens; a second flexible deflecting mirror disposed to direct images to an exposure area, the first mirror directing images to said second mirror, the image directed by said second mirror changing with the pivoting motion of the first mirror; and a flexing means for causing flexing of said second mirror, controllable in dependence of the pivoting motion of the first mirror and the characteristics of the lens, wherein the flexing means comprises a magnet coil and a pusher rod, the pusher rod being located adjacent the second mirror and being movable against the second mirror upon activation of the magnet coil.

4,886,330

INFRA RED IMAGING SYSTEM

James Linick, Grand' Rue 12A, Fribourg 1700, Switzerland

PCT No. PCT/CH87/00078, § 371 Date Apr. 7, 1988, § 102(e) Date Apr. 7, 1988

PCT Filed Jun. 30, 1987, Ser. No. 188,396

Claims priority, application Switzerland, Aug. 7, 1986, 0347/86

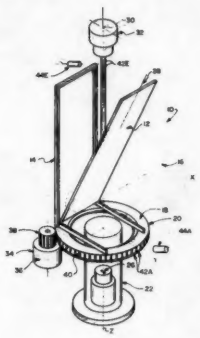
Int. Cl.[4] G02B *26/08*

U.S. Cl. 350—6.5 13 Claims

1. A search apparatus for use in conjunction with an imaging system having a planar detector array, comprising in combination:

a plano mirror including a reflective face

azimuthal means for rotatably mounting said mirror in a position in front of the input to the imaging system to rotate said mirror about an azimuthal axis of rotation and in an azimuthal plane of rotation, the azimuthal plane of rotation being parallel to and centered upon the planar detector array of the imaging system; and



elevational means for elevationally pivoting said mirror about an elevational axis offset from and perpendicular to the azimuthal axis of rotation of said mirror.

4,886,331

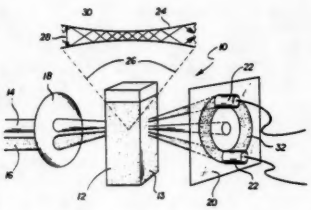
THERMO-OPTICALLY INDUCED WAVEGUIDE

Lauren M. Peterson, Ann Arbor, Mich., assignor to Environmental Research Institute of Michigan, Ann Arbor, Mich.

Filed Mar. 17, 1988, Ser. No. 169,316

Int. Cl.[4] G02B *6/10*

U.S. Cl. 350—96.12 26 Claims



1. A thermo-optical waveguide comprising:

a homogeneous medium at least partially absorptive of optical energy of a preselected wavelength and whose refractive index changes in response to rapid thermalization of absorbed optical energy;

a pulsed, optical switch beam of said preselected wavelength focused on the medium and having an energy level adapted to change the refractive index of an illuminated portion of the medium so as to create an optically induced waveguide therethrough, the waveguide being characterized by a refractive index differing from the refractive index of the remainder of the medium; and

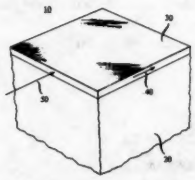
an optical probe beam focused on the medium and angularly offset with respect to the pulsed beam such that the probe beam is optically confined within of the waveguide to energy therefrom as a diverging, cone-shaped beam.

4,886,332

OPTICAL SYSTEMS WITH THIN FILM POLARIZATION ROTATORS AND METHOD FOR FABRICATING SUCH ROTATORS

Raymond Wolfe, New Providence, N.J., assignor to American Telephone and Telegraph Company, Murray Hill, N.J.

Filed Oct. 19, 1987, Ser. No. 109,989
Int. Cl.[4] G02B 5/30
U.S. Cl. 350—96.12 13 Claims



1. An optical system, comprising:

a source of electromagnetic radiation;

a component of said system, capable of optical communication with said source, serving to transmit or reflect at least a portion of the electromagnetic radiation emitted by said source; and

a polarization rotator including a thin film optical waveguide, capable of optical communication with said source and said component, characterized in that

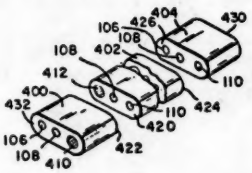
said thin film waveguide exhibits essentially zero linear birefringence in the absence of an extremely applied stress in relation to at least one wavelength of incident, linearly polarized light of any polarization orientation.

4,886,333

FIBER LASER SENSOR

John W. Hicks, 312 Howard St., Northboro, Mass. 01532

Continuation of Ser. No. 763,126, Aug. 6, 1985, Pat. No. 4,730,886. This application Mar. 14, 1988, Ser. No. 167,332
Int. Cl.[4] G02B 6/26
U.S. Cl. 350—96.15 7 Claims



1. A fiber laser sensor system for measuring a desired parameter by means of fiber laser sensors which are sensitive to both a change in said desired parameter and a change in another parameter, said sensor system comprising

at least three fiber laser sensors, each of said sensors comprising a first fiber laser oscillator, a second fiber laser oscillator, an energy transfer element optically coupled to both said first fiber laser oscillator and said second fiber laser oscillator to allow energy transfer between said first oscillator and said element and said second oscillator and said element. said element constituting a loss element for all net energy remaining in said element from energy transfers between said element and said first and second laser oscillators, and means for changing the optical path length of at least one of said oscillators to generate an output which varies in accordance with the magnitudes of one or more parameters,

means for mixing the outputs of pairs of said sensors to obtain beat frequencies, and

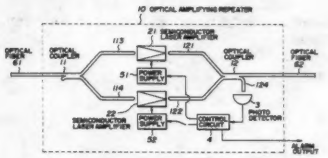
means for detecting and combining said beat frequencies to eliminate variations due to parameters other than said desired parameter in order to generate a final output which varies only in accordance with said desired parameter.

4,886,334

OPTICAL AMPLIFYING REPEATER

Yasuhiro Aoki, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

Filed Sep. 1, 1988, Ser. No. 239,352
Claims priority, application Japan, Sep. 1, 1987, 62-219430; Sep. 1, 1987, 62-219431
Int. Cl.[4] G02B 6/00
U.S. Cl. 350—96.15 2 Claims



1. An optical amplifying repeater comprising,

an optical dividing means for dividing an input signal light propagated through a first transmission optical fiber into signal lights of a predetermined number,

optical amplifiers of said predetermined number, each of said optical amplifiers amplifying a corresponding one of said signal lights to provide an amplified signal light,

an optical combining means for combining said amplified signal lights from said optical amplifiers to supply a second transmission optical fiber with a combined signal light,

a monitor means for the monitor of a level of said combined signal light to produce a monitor signal, and

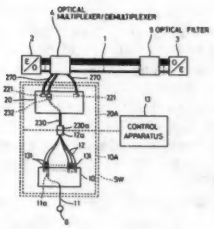
a control means for controlling an amplification gain of at least one optical amplifier among said optical amplifiers in response to said monitor signal whereby said level is held to be a predetermined value.

4,886,335

OPTICAL FIBER SWITCH SYSTEM

Hisaharu Yanagawa; Toshihiro Ochiai; Hidenisa Miyazawa; Shizuka Yamaguchi; Tsuyoshi Fumeno; Hiroshi Raijo, and Seiji Ohmizu, all of Ichihara, Japan, assignors to Furukawa Electric Co., Ltd., Tokyo, Japan

Filed Dec. 28, 1988, Ser. No. 290,996
Claims priority, application Japan, Jan. 7, 1988, 63-1535
Int. Cl.[4] G02B 6/36; H01J 5/16; H04B 9/00; G02F 1/00
U.S. Cl. 350—96.20 19 Claims



1. An optical switch system comprising:

first optical switch means for optically connecting one end face of a single first optical fiber selectively to one end face of any one of n second optical fibers; and

second optical switch means for optically connecting end faces of n third optical fibers collectively and substantially synchronously to end faces of fourth optical fibers of a desired bundle selected from a plurality of optical fiber bundles each composed of substantially n optical fibers, said third optical fibers being optically connected at other end faces to other end faces of said second optical fibers.

4,886,336

STORAGE DEVICE FOR A SPARE LENGTH OF AT LEAST ONE OPTICAL FIBRE

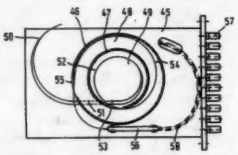
Peter G. Deusser, Cologne; Detlef M. Boehm, Neunkirchen-Seelscheid, and Johann A. Becker, Overath, all of Fed. Rep. of Germany, assignors to U.S. Philips Corp., New York, N.Y.

Filed Mar. 1, 1988, Ser. No. 162,525

Claims priority, application Fed. Rep. of Germany, Mar. 3, 1987, 3706768

Int. Cl.[4] G02B 6/36

U.S. Cl. 350—96.20 **19 Claims**



1. A storage device for a spare length of at least one optical fibre which emerges from a cable end, which storage device can be arranged in the vicinity of the cable end and comprises a flat storage space in which the spare length is arranged in the form of a coil, an end of optical fibre which leads to a joint being extractable, during which operation the diameter of the coil is reduced, the storage space comprising guide walls which determine the minimum inner coil diameter, the maximum outer coil diameter and the axial height, and a core (6) whose radius is larger than the mechanically permissible minimum bending radius of the optical fibre or fibre ribbon and smaller than the minimum bending radius of the optical fibre or fibre ribbon required to ensure that attenuation is not increased, characterized in that the storage space is subdivided into two winding spaces (7, 8, 48, 49), one of which (8, 48) accommodates the connection lengths (54) required for forming the joint (56) while the other winding space (7, 49) accommodates a mobility length (52) required for moving the storage device away from the cable end, lengths of the optical fibre being independently slidably extractable from and insertable into their respective winding spaces.

4,886,337

MANIPULATOR DEVICE FOR THE TRANSFER OF LASER LIGHT INTO AN OPTICAL FIBER

Jacob Rasgaard, and Claus J. Nielsen, both of Lyngby, Denmark, assignors to DantecElectronik, Medicinsk OG Videnskabeligt Måleudstyr A/S, Skovlunde, Denmark

Filed Aug. 25, 1988, Ser. No. 236,205

Claims priority, application Denmark, Aug. 31, 1987, 4550/87

Int. Cl.[4] G02B 6/36

U.S. Cl. 350—96.20 **8 Claims**

1. A manipulator device for the transfer of laser light into an optical fibre and of the type comprising

supporting means for an optical fibre,

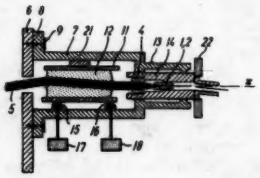
means for adjusting the position of the end face of the optical fibre in the axial direction (z-axis) of the fibre corresponding to the optical axis of the manipulator and in relation to a focused laser beam,

an optical system for the focusing of a laser beam arriving substantially axially at an end surface of the optical fibre,

means for adjusting the spot of light provided by the focused laser beam on the end face of the fibre in two axial x- and y-directions perpendicular to each other and to said z-axis, and

means for angularly adjusting the axial direction of the fibre in relation to the axial direction of the laser beam incident on the end face of the fibre,

housing means adapted to be located in the path of the



laser beam and provided with an inlet opening for the arriving laser beam,

a mainly tubular plug means displaceable in the axial z-direction in relation to the housing for the optical fibre and for focusing optics, resp., the latter being substantially axially centred on the axis of the fibre,

a supporting tube accommodated in the housing for an optical glass body axially disposed on the z-axis,

and means for maintaining the supporting tube in contact with adjusting means located respectively at either end of the supporting tube and adapted to adjust the position of the supporting tube in relation to the z-axis in the housing means.

4,886,338

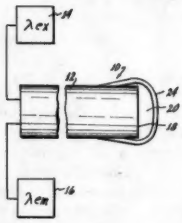
OPTICAL FIBER EVENT SENSOR

Masao Yafuso, El Toro, and Henry K. Hui, Irvine, both of Calif., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Division of Ser. No. 917,913, Oct. 10, 1986, Pat. No. 4,798,738. This application Oct. 11, 1988, Ser. No. 256,305

Int. Cl.[4] G02B 6/02; A61B 5/00; C09B 67/00; G01N 33/48

U.S. Cl. 350—96.29 **11 Claims**



1. An event sensor which comprises:

an optical fiber, said optical fiber having an optical surface;

a matrix of a regenerated polymeric material;

a plurality of event sensing dye groups, said event sensing dye groups chemically bound to said polymeric material; and

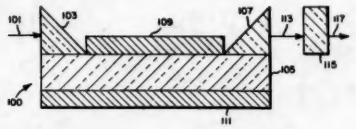
said matrix of said regenerated polymeric material formed in situ on said optical surface of said optical fiber.

4,886,339

OPTICAL ARTICLE CONTAINING A TRANSMISSION MEDIUM EXHIBITING A HIGH LEVEL OF SECOND ORDER POLARIZATION SUSCEPTIBILITY

Michael Scozzafava; Donald P. Specht; Abraham Ulman; Craig S. Willand, all of Rochester, and David J. Williams, Fairport, all of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Sep. 28, 1987, Ser. No. 101,897
Int. Cl.[4] G02B 6/00, 1/08
U.S. Cl. 350—96.34 25 Claims



1. An optical article containing, for the transmission of electromagnetic radiation, a medium exhibiting a second order polarization susceptibility greater than 10^{-9} electrostatic units comprised of polar aligned noncentrosymmetric molecular dipoles having an electron donor moiety linked through a conjugated π bonding system to an electron acceptor moiety to permit oscillation of the molecular dipole between a ground state exhibiting a first dipole moment and an excited state exhibiting a differing dipole moment,

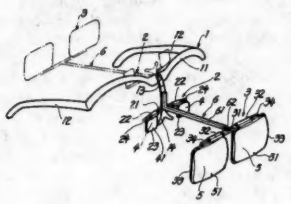
characterized in that the molecular dipoles are held in polar alignment by a crosslinked polymeric binder and form at least 1 percent of said transmission medium based on the weight of the crosslinked polymeric binder.

4,886,340

OPTICAL DEVICE FOR PRECISION WORK

Kouji Kanda, Osaka, Japan, assignor to Kanda Optical Co., Ltd., Japan

Filed Jul. 11, 1988, Ser. No. 217,558
Claims priority, application Japan, Jul. 20, 1987, 62-181721
Int. Cl.[4] G02B 23/00, 7/06
U.S. Cl. 350—145 13 Claims



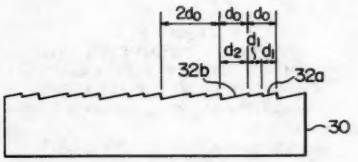
1. An optical device including a pair of eyepiece concave lenses and a pair of objective convex lenses for use in precision work, the device being characterized in that the device comprises a wearing member to be attached to the body of the user; first lens holding means provided on the wearing member and having attached thereto the pair of eyepiece concave lenses spaced apart by an adjustable distance; and second lens holding means connected to the wearing member or to the first lens holding means and having attached thereto the pair of objective convex lenses spaced apart by an adjustable distance and spaced from the concave lenses by an adjustable distance; each of the eyepiece concave lenses and the objective convex lenses having an optical center positionable on the visual axis extending from the corresponding eye of the user to an object.

4,886,341

DIFFRACTION GRATING HAVING A PLURALITY OF DIFFERENT GRATING CONSTANTS

Konosuki Oishi, Mito, and Kenshi Sugahara, Katsuta, both of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Jul. 1, 1987, Ser. No. 68,412
Claims priority, application Japan, Jul. 2, 1986, 61-155647
Int. Cl.[4] G02B 5/18; G01J 3/28
U.S. Cl. 350—162.22 6 Claims



1. A diffraction grating comprising a plurality of adjacent sets of different grating constants repetitively arranged at a constant period, each set including at least one groove, wherein when it is assumed that the different grating constants are d_1, d_2 . . . , there is a relation of:

$$d_0 = md_1 = nd_2 = \ldots$$

where m and n are different natural numbers and d_0 is a constant; and

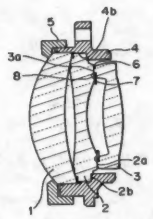
wherein the constant period equals d_0 times the number of the plurality of adjacent sets of different grating constants.

4,886,342

PHOTOGRAPHIC LENS DEVICE

Yoshinobu Kudo, Osaka, and Kiyohiro Yoshida, Aichi, both of Japan, assignors to Minolta Camera Kabushi Kaisha, Osaka, Japan

Continuation of Ser. No. 126,788, Nov. 30, 1987, abandoned.
This application May 22, 1989, Ser. No. 355,800
Claims priority, application Japan, Dec. 3, 1986, 61-288326
Int. Cl.[4] G02B 7/02, 9/16
U.S. Cl. 350—252 9 Claims



1. A photographing lens device, comprising:

a first lens having a polished lens surface;

a second lens, having a polished lens surface offset from and of a smaller area than the first lens polished surface, and positioned adjacent to said first lens, the second lens having a contact portion outside an effective light path which extends through the second lens polished lens surface, the contact portion positioned immediately opposite the first lens polished lens surface and directly pressed against said first lens polished lens surface for positioning said second lens relative to said first lens, the second lens further having a flat face formed thereon outside an effective light

path therein and a contacting face formed thereon outwardly of said flat face;

a third lens adjacent to said second lens and having a flat face formed thereon outside an effective light path therein;

an adhering means for adhering said flat faces of said second and third lenses to each other;

a first member for contacting with said contacting face of said second lens to hold said second lens against said first lens; and

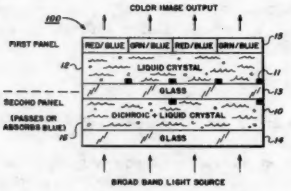
a second member coupled to said first member for pressing said first lens against said second lens.

4,886,343

APPARATUS AND METHOD FOR ADDITIVE/SUBTRACTIVE PIXEL ARRANGEMENT IN COLOR MOSAIC DISPLAYS

Michael J. Johnson, Phoenix, Ariz., assignor to Honeywell Inc., Minneapolis, Minn.

Filed Jun. 20, 1988, Ser. No. 211,827
Int. Cl.[4] G02F 1/13
U.S. Cl. 350—335 **20 Claims**



1. A liquid crystal display system comprising:

first panel means for controlling transmission of red and green image components therethrough; and

second panel means for controlling transmission of blue image components therethrough, said second panel components being aligned with said red and green image components.

8. The method of displaying an image, said method comprising the steps of:

controllably transmitting blue image components through a second panel in response to white light applied thereto; and

controllably transmitting red and green image components through a first panel, said second panel receiving light from said second panel.

4,886,344

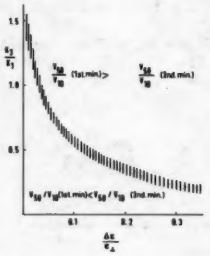
ELECTRO-OPTICAL DISPLAY ELEMENT

Bernhard Scheuble, Alsbach; Günter Baur, Freiburg, and Waltraud Fehrenbach, Erlenweg, all of Fed. Rep. of Germany, assignors to Merck Patent Gesellschaft Mit Beschrankter Haftung, Darmstadt, Fed. Rep. of Germany

Continuation of Ser. No. 774,680, Sep. 11, 1985, abandoned. This application Aug. 19, 1988, Ser. No. 235,753
Claims priority, application Fed. Rep. of Germany, Sep. 11, 1984, 3433248
Int. Cl.[4] G02F 1/13
U.S. Cl. 350—350 R **18 Claims**

1. In an electro-optical display element based on a liquid-crystalline phase comprising at least two compounds, the improvement wherein the electro-optical characteristic curve of the phase in the first Gooch and Tarry transmission minimum is at least as steep as that in the second such transmission minimum.

18. A method of simultaneously minimizing the dependence of contrast on the angle of observation of an electro-optical display element based on a liquid crystal phase and of maximizing the multiplexing capacity of said element by maximizing the steepness of the characteristic curve of said element, comprising operating the element in the first Gooch and Tarry transmission minimum, and selecting a phase having a K_3/K_1



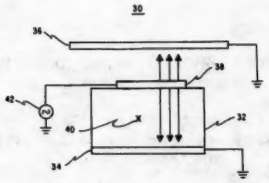
ratio and a $\Delta\epsilon/\epsilon_\perp$ ratio consistent with the attainment of a characteristic curve in the first transmission minimum which is steeper than that in the second such transmission minimum.

4,886,345

ELECTRO-OPTICAL PHASE MODULATOR

Marc H. Popek, Indian Harbour Beach, Fla., assignor to Harris Corporation, Melbourne, Fla.

Filed Aug. 5, 1988, Ser. No. 228,655
Int. Cl.[4] G02F 1/01
U.S. Cl. 350—355 **5 Claims**



1. An electro-optical phase modulator comprising;

a crystal having top and bottom parallel surfaces and an end surface, wherein said end surface is adapted to receive light to be modulated;

a bottom ground plane proximate said bottom surface;

a top ground plane proximate said top surface, wherein said top ground plane overhangs said top surface;

a signal conductor disposed between said top surface and said top ground plane, wherein said signal conductor is adapted to receive a modulating signal for modulating the light passing through said crystal.

4,886,346

METHOD AND APPARATUS FOR IMPROVING THE ANGULAR APERTURE OF AN AODLF

Milton Gottlieb, Churchill, and Nathan T. Melamed, Pittsburgh, both of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

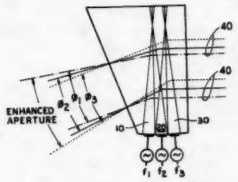
Filed Feb. 16, 1988, Ser. No. 156,043
Int. Cl.[4] G02F 1/11
U.S. Cl. 350—358 **3 Claims**

1. A method of increasing the angular aperture of an acousto-dispersive light filter comprising an optically birefringement crystal having an optical input face with an optic axis and an optical output face, said method comprising the steps of:

(a) applying light to the optical input face at an angle of incidence within an angular aperture, the angle of inci-

dence being within a predetermined angular distance from the optic axis; and

(b) launching a plurality of acoustic waves of differing frequencies into the crystal at respective angles to each other so that the light exits the optical output face at a given angle with respect to the optical output face regardless of said angle of incidence.



4,886,347

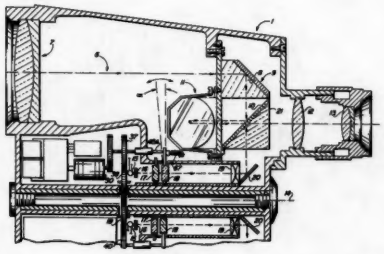
RANGE-FINDING BINOCULAR

John N. Monroe, Rte. 3, Box 361-M, Waco, Tex. 76708

Filed Feb. 22, 1988, Ser. No. 158,870

Int. Cl.[4] G02B *23/10, 27/34;* G01C *3/14*

U.S. Cl. 350—551 **8 Claims**



1. In a binocular characterized by two monocular barrels coupled at a hinge-line for adjusting the binocular to the inter-ocular distance of an individual user, and in which each monocular includes a first optical path between an objective lens and an eye lens, the improvement which adapts such binocular to range-finding operation which includes a second optical path in each monocular for generating a range-mark in the focal plane thereof, said second optical path comprising:

A) a light source;

B) a reticle;

C) a range-mark adjustment plate;

D) a mirror; and

E) a beam splitter; and in which:

F) said light source is disposed to back-light said reticle whose image passes through said range-mark translation plate to said mirror from which said image of said reticle is reflected to said beam splitter;

G) said reticle is configured such that said range-mark is characterized by circular symmetry; and

H) said beam splitter is situated in the optical path between the objective lens and the eye lens such that said image of said reticle appears in the focal plane of said monocular, at a point in the focal plane representing the direction of the hinge line, as a range-mark exhibiting circular symmetry;

said improvement further comprising:

I) range-mark translation plate adjustment means adapted to tilt said range-mark translation plate about an axis which is perpendicular to a plane containing both the binocular hinge-line and the first optical path to selectively move the position of an image of said range-mark in the focal plane of said monocular; whereby, when the barrels of said binocular are rotated about the hinge-line, the range-marks of circular symmetry in the focal planes do not move within those focal planes relative to a scene viewed at infinity.

4,886,348

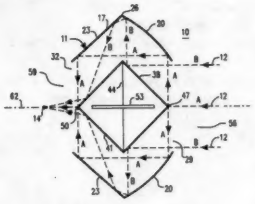
TOTAL TRANSMISSIBILITY OPTICAL SYSTEM

John C. Schmertz, Pittsburgh, Pa., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Oct. 26, 1988, Ser. No. 262,847

Int. Cl.[4] G02B *5/10;* G21C *17/08*

U.S. Cl. 350—622 **24 Claims**



1. Apparatus for focusing a generally parallel beam of radiation to a focal point, said focusing apparatus comprising:

a first reflector having a generally conical shaped outer reflective surface, the conical reflective surface being oriented so that the axis thereof is generally parallel to the beam;

a second reflector having a generally paraboloidal inner reflective surface which generally surrounds the first reflector and has an aperture for transmitting the beam of radiation therethrough;

a third reflector abutting the second reflector and having a generally conical shaped inner reflective surface, the third reflector having an aperture formed by the removal of its apex for transmission of the focused radiation beam therethrough and said second and third reflective surfaces having a contiguous margin; and

a fourth reflector generally surrounded by the third reflector abutting the first reflector and having a generally conical shaped outer reflective surface with the axis thereof generally parallel to the beam, and said first and fourth reflective surfaces having a contiguous margin, the four reflectors cooperating to focus the beam of radiation to a point.

4,886,349

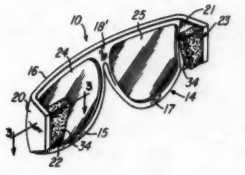
TEMPLES-LESS EYEGLASS FRAME

Michael A. Willis, Dayton, Ohio, assignor to Michael Allen, Panama City Beach, Fla.

Filed Nov. 27, 1987, Ser. No. 125,874

Int. Cl.[4] G02C *5/14, 5/16*

U.S. Cl. 351—111 **2 Claims**



1. A temples-less eyeglass frame comprising a central nose bridge portion having separate but mating male and female

joints, each having raised projections with alternating recesses, left and right lens frame portions, a left wing portion substantially perpendicular to said left lens frame portion, a right wing portion substantially perpendicular to said right lens frame portion, and left and right resilient foam temple bearing members attached to the inner end surfaces of said left and right wing portions, said members resting in and exerting pressure on both temple areas only of the wearer when in use.

4,886,350

PERFORATED SOFT CONTACT LENS AND A METHOD FOR MANUFACTURING THEREOF

Otto Wichterle, Praha, Czechoslovakia, assignor to Ceskoslovenska Akademie ved, Praha, Czechoslovakia

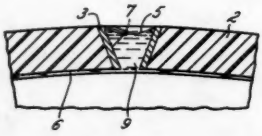
Continuation of Ser. No. 30,171, Mar. 18, 1987, abandoned, which is a continuation of Ser. No. 684,861, Dec. 21, 1984, Pat. No. 4,666,267. This application Aug. 4, 1988, Ser. No. 230,693

Claims priority, application Czechoslovakia, Dec. 30, 1983, 10208-83

The portion of the term of this patent subsequent to May 19, 2004, has been disclaimed.

Int. Cl.[4] G02C *7/04*

U.S. Cl. 351—160 H **2 Claims**



1. In a soft contact lens the improvement which comprises at least one perforation through the lens within the optical zone thereof and at a distance from 0 to 3.5 mm. from the lens center, the perforation having a circular cross-section and a diameter of 0.2 to 1.5 mm. and being located substantially in the center of the lens, said perforation also being larger in cross-section at the outer convex surface and being smaller in cross-section at the inner concave surface of the lens.

4,886,351

SCANNING CATADIOPTRIC OPHTHALMOSCOPE

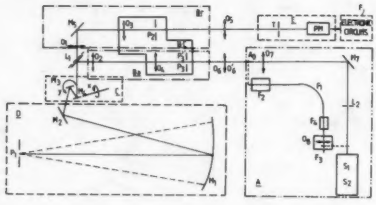
Joseph C. Sabban, Orsay; Jean-Claude Rodier, Les Ulis; André Roussel, Brunoy, and Jacques F. Simon, Paris, all of France, assignors to Centre National de la Recherch Scientifique, Paris, France

Continuation of Ser. No. 673,842, Nov. 26, 1984, abandoned. This application Sep. 14, 1988, Ser. No. 246,013

Claims priority, application France, Nov. 21, 1983, 83 18512

Int. Cl.[4] A61B *3/10*

U.S. Cl. 351—221 **19 Claims**



1. A scanning ophthalmoscope, comprising:

light source means for producing an illuminating beam;

scanning and transmitting means for transmitting the illuminating beam into an eye through a pupil thereof, and for transmitting a return beam from the eye along a coincident optical path with the illuminating beam, said scanning and transmitting means including:

two dimensional scanning means for detecting the illuminating beam over a raster of lines; and

optical means for transmitting the deflected light into the eye, said optical means producing an image of the pupil in the vicinity of said two dimensional scanning means, and for collecting return light from the eye into the return beam, the deflected light and the return light both having a small geometric extent at a level of the pupil and said two-dimensional scanning means deflects the return beam oppositely to the illuminating beam to maintain coincidence of the return beam with the optical path of the illuminating beam; and

eye observing means for collecting the return beam.

4,886,352

DEVICE FOR CONVEYING PHOTOGRAPHIC PAPER FOR USE IN PHOTOGRAPH PRINTING APPARATUS

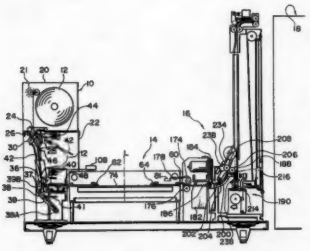
Yoshio Ozawa, and Takao Shigaki, both of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Jun. 13, 1988, Ser. No. 206,059

Claims priority, application Japan, Jun. 19, 1987, 62-152616

Int. Cl.[4] G03B *29/00, 27/58*

U.S. Cl. 355—28 **20 Claims**



1. A device for conveying a photographic paper to allow images to be successively exposed on a continuous photographic paper, cutting the same into frames, and conveying them to an ensuing process performed by, for example, a development device, comprising:

(a) a portion for accommodating said continuous photographic paper;

(b) a printing portion disposed on the downstream side of said accommodating portion and which exposes an image on said photographic paper which has been drawn from said accommodating portion;

(c) a pair of mask heads disposed in said printing portion for determining a region on which said image is exposed by coming closer to and moving away from each other with respect to an optical axis for printing;

(d) a cutter disposed on the downstream side of said printing portion for cutting said photographic paper into frames;

(e) conveying means for conveying said photographic paper from said accommodating portion to said printing portion and said cutter on the downstream side, and which can reversely convey said photographic paper in the upstream direction; and

(f) control means for controlling the relative positional relationship between said photographic paper and said mask heads in such a manner that when the portion to be printed at the front end of said photographic paper is located in said printing portion, said front end of said photographic paper is covered by either of said mask heads both in the case where a print provided with a margin is obtained and in the case where a margin-less print is obtained, and that the distance at the front end portion of said photographic

paper covered by said mask head is longer in the case of a print provided with a margin than that in the case of a margin-less print, whereby

the length of the photographic paper to be cut off is shortened so as to use said photographic paper effectively.

4,886,353

MEASURING DEVICE EMPLOYING LASER INTERFEROMETRY

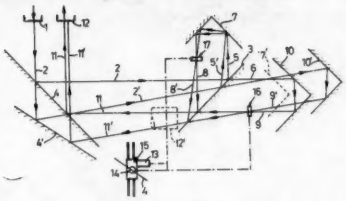
Bernard Fondeur, Coye-La-Foret, France, assignor to D.E.A. Digital Electronic Automation S.p.A., Moncalieri, Italy

Filed Mar. 17, 1988, Ser. No. 169,416

Claims priority, application France, Mar. 17, 1987, 87 03640

Int. Cl.[4] G01B *9/02*

U.S. Cl. 356—4.5 **9 Claims**



1. A measuring device employing laser interferometry and comprising at least an interferometric cell and a mobile reflector designed to move in relation to the same; said cell comprising a coherent light source emitting a source beam, an interferometric separator splitting said source beam into a first beam and a second beam, a fixed reflector for reflecting said first beam back to said separator, said mobile reflector receiving said second beam and reflecting a return beam to said separator whereby said first beam and said return beam form a reunited beam a receiver; of said required beam and a tracking device located between said interferometric separator and said source and receiver for tracking displacement of said mobile reflector by controlling the direction of said source and reunited beam, no further control being provided on said second or return beam and located upstream from said interferometric separator.

4,886,354

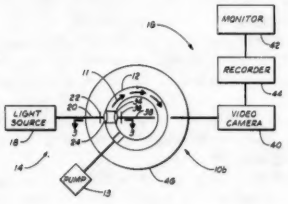
METHOD AND APPARATUS FOR MEASURING CRYSTAL FORMATION

Gary E. Welch; Marvin R. Appel, both of Ponca City, and Jerry R. Bittle, Blackwell, all of Okla., assignors to Conoco Inc., Ponca City, Okla.

Filed May 6, 1988, Ser. No. 191,306

Int. Cl.[4] G01N *33/26, 21/21*

U.S. Cl. 356—70 **3 Claims**



1. An apparatus for measuring the formation or crystals in a flowing liquid, comprising:

a piping loop having first and second opposing transparent windows defined therein;

a peristaltic pump associated with said piping loop for pumping a volume of said liquid through said piping loop;

illuminating means for directing a beam of polarized light through said first and second opposing transparent windows, positioned adjacent said second transparent window;

a video camera positioned adjacent said first transparent window for receiving an image therefrom; and

a constant temperature bath for immersing said piping loop therein.

4,886,355

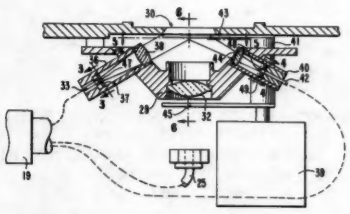
COMBINED GLOSS AND COLOR MEASURING INSTRUMENT

Thomas J. Keane, 307 Twisted Stalk Dr., Gaithersburg, Md. 20878

Filed Mar. 28, 1988, Ser. No. 173,099

Int. Cl.[4] G01N *21/27, 21/57*

U.S. Cl. 356—73 **15 Claims**



1. An instrument for measuring gloss and color of a sample surface comprising a probe defining a position to receive a sample surface to be measured, a source of visible light, a first fiber optic bundle arranged to receive light from said source and irradiate a sample surface received at said position with light from said source, said bundle including a plurality of fibers having transmitting ends pointed at said sample surface so as to illuminate said sample surface at a first angle, a second fiber optic bundle having a transmitting end pointed at said sample surface so as to irradiate said sample surface with light transmitted through said second fiber optic bundle at a second angle different than said first angle, first fiber optic means positioned to receive light diffusely reflected from said surface as a result of irradiation of said surface by said first fiber optic bundle, second fiber optic means arranged to receive light from said second fiber optic bundle and specularly reflected from said surface, means to detect the intensity of light received by said first fiber optic means, and means to detect the intensity of light received by said second fiber optic means.

4,886,356

DETECTOR CELL FOR LIQUID CHROMATOGRAPHY

Roland C. Paradis, Newtown, Conn., assignor to The Perkin-Elmer Corporation, Norwalk, Conn.

Filed Apr. 1, 1988, Ser. No. 176,524

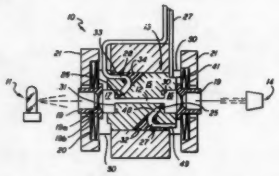
Int. Cl.[4] G01N *21/05*

U.S. Cl. 356—246 **8 Claims**

5. A detector cell assembly for use in a spectrophotometer including a source of radiation and a photodetector spaced from the source, the cell assembly being positionable between the radiation source and the photodetector and comprising:

a polymeric body having a bore therethrough with open ends and radiation transparent windows with substantially flat surfaces respectively closing the ends of the bore and further having an inlet passage and an outlet passage opening into the bore respectively adjacent the opposite ends thereof for flowing fluid therethrough; wherein

the body is thermally insulating to the fluid flowing in the bore, the polymeric body has an outwardly facing annular surface defined on a protruding boss respectively encircling each end of the bore approximately normal thereto and in contact with a corresponding substantially flat



surface on the respective window, and the cell assembly further comprises urging means for urging each respective transparent window against the respective protruding boss to effect a seal between the polymeric body and each transparent window.

4,886,357

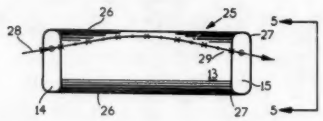
INTERNAL REFLECTION ELEMENT WITH INSENSITIVE EDGES

Nicolas J. Harrick, Croton Dam Rd., Ossining, N.Y. 10567

Filed Sep. 6, 1988, Ser. No. 240,600

Int. Cl.[4] G01J *3/42*

U.S. Cl. 356—300 **23 Claims**



1. A internal reflection element for use in internal reflection spectroscopy, comprising:

a radiation-transparent body having at least one sampling surface and an entrance surface for receiving a beam of radiation at an angle causing the beam to propagate through the body by reflection from the sampling surface at an angle exceeding the critical angle, said body having at least one surface whereby it can be supported,

and means along said supporting surface for preventing exiting of any radiation incident thereon and without modulating said radiation.

4,886,358

ORGANIC VAPOR ASSAY BY RAMAN SPECTROSCOPY

Robert E. Pellenbarg, Silver Spring, Md., and David E. Tevault, Springfield, Va., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed May 31, 1988, Ser. No. 200,324

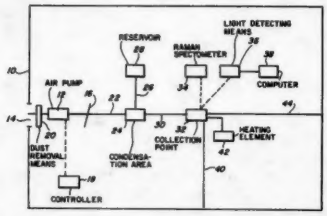
Int. Cl.[4] G01J *3/44;* G01N *21/65*

U.S. Cl. 356—301 **21 Claims**

1. A method of detecting and quantifying an organic material in the atmosphere, comprising:

a. collecting an air sample from the atmosphere;

b. cooling the air sample to form a condensate consisting essentially of water and organic material from the air sample; and



c. analyzing the condensate by Raman spectroscopy to detect and quantify the constituents in the organic material.

4,886,359

DEVICE FOR NEBUILIZING SAMPLE LIQUID FOR SPECTROSCOPICAL PURPOSES

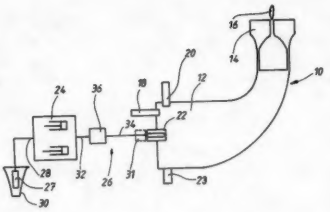
Harald Berndt, Auf der Bokkenbredde 48, 4600 Dortmund 41, Fed. Rep. of Germany

Continuation of Ser. No. 872,885, Jun. 11, 1986, abandoned. This application Oct. 11, 1988, Ser. No. 256,238

Claims priority, application Fed. Rep. of Germany, Jun. 15, 1985, 3521529

Int. Cl.[4] G01N *21/72, 21/73, 21/74*

U.S. Cl. 356—312 **19 Claims**



1. A device for nebulizing sample liquid for spectroscopical purposes,

comprising:

(a) a nozzle means for converting high pressure of a fluid supplied to an inlet orifice thereof to high speed of said fluid emerging from an outlet orifice, and

(b) high pressure pump means for supplying fluid under high pressure to said inlet orifice to nebulize said fluid by its own high outlet speed at the outlet of said nozzle,

wherein

(c) said high pressure pump means comprise a separate high pressure pump unit means for providing an output pressure of at least 30 bar,

(d) said high pressure pump unit is arranged remote from the nozzle and connected to said nozzle through conducting means for supplying said high pressure from the high pressure pump means to said inlet orifice; and

(e) said outlet orifice has a flow aperture of less than $5 \cdot 10^{-9}$ m^2.

4,886,360

METHOD AND APPARATUS FOR PARTICLE ANALYSIS

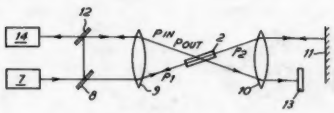
Martin F. Finlan, Aylesbury, England, assignor to Amersham International plc, Buckinghamshire, United Kingdom

Filed Sep. 15, 1987, Ser. No. 96,408

Claims priority, application United Kingdom, Sep. 25, 1986, 8623072

Int. Cl.[4] G01B 9/02; G01N 15/02

U.S. Cl. 356—335 18 Claims



1. Apparatus for particle analysis, said apparatus comprising a container made of electromagnetic radiation transparent material for containing a fluid sample to be analysed, means for setting up, within the sample, a stationary electromagnetic field comprising regions of high and low field intensity in a standing wave pattern in such a way as to establish within the sample a grating, means for applying to said grating an input wave of electromagnetic radiation in such a way as to cause said grating to generate a phase conjugate wave and means for measuring the intensity of said phase conjugate wave.

4,886,361

FLAT TACTILE SENSOR

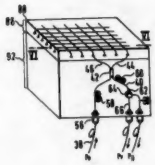
Norbert Fürstenau, Braunschweig, Fed. Rep. of Germany, assignor to Versuchsanstalt fur Luft, Cologne, Fed. Rep. of Germany

Filed May 12, 1988, Ser. No. 193,551

Claims priority, application Fed. Rep. of Germany, May 12, 1987, 3715693

Int. Cl.[4] G01B 9/02

U.S. Cl. 356—345 7 Claims



1. A flat tactile sensor comprising at least one pair of fiberoptic interferometer-type sensing elements, each of said sensing elements including an input measuring arm having a sensing portion and an input end remote from the sensing portion thereof, an input light source for the input measuring arm at the input end thereof, an output measuring arm having a sensing portion and an output end remote from the sensing portion thereof and a readout measuring means at the output end of the output measuring arm thereof, each of said sensing elements including a monomode directional coupler for coupling the input and output measuring arms thereof, the sensing portions of the measuring arms of each of said sensing elements being substantially straight and being disposed in substantially parallel spaced relation to each other, the sensing portion of each of the measuring arms of one sensing element of said pair of sensing elements being disposed in spaced, angular crossing relation with respect to the sensing portion of one of the measuring arms of the other sensing element of said pair, said sensor further comprising support means for supporting the sensing portions of said measuring arms, said support means including a support surface and an elastic layer on said support surface, said elastic layer supporting said sensing portions so that the sensing portions of different sensing elements are normally spaced in a direction toward said support surface but so that said sensing portions are flexible in a direction toward said support surface to alter the respective lengths of said sensing portions, the readouts of said sensing elements each including means for counting the interference fringes generated as a result of the differences in the lengths of the respective sensing portions thereof.

4,886,362

APPRATUS FOR MEASURING THE PROFILE OF AN ASPHERICAL SURFACE

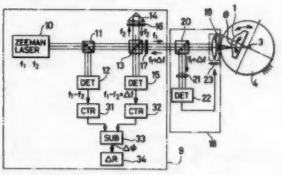
Masahiro Oono, Tokyo, Japan, assignor to Asahi Kogaku Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Aug. 13, 1987, Ser. No. 84,766

Claims priority, application Japan, Aug. 13, 1986, 61-190889

Int. Cl.[4] G01B 9/02

U.S. Cl. 356—346 4 Claims



1. An apparatus for measuring the profile of an aspherical surface, comprising means for turning an aspherical surface through a determined angle θ about an axis, an optical probe for detecting an amount of displacement ΔR in a radial direction of said turning aspherical surface, and an optical measuring circuit,

wherein said optical measuring circuit comprises:

a source of a first beam and a second beam light of different respective frequencies f_1 and f_2;

first means for detecting a beat signal arising from interference between said first and second beams; and

means for deriving a variation of a frequency of said beat signal, said variation being related to said displacement ΔR; and

wherein said optical probe comprises:

an auto-focusing objective lens for continuously converging said first beam onto said turning aspherical surface;

light separating means for directing light reflected from said aspherical surface to said optical measuring circuit;

a source of focusing light incident upon said light separating means and reflected by said light separating means onto said aspherical surface, said light separating means directing said light reflected from said aspherical surface toward said focusing light source;

means, interposed between said focusing light source and said light separating means, for reflecting said light reflected toward said focusing light source to produce focus error light;

means for receiving said focus error light and for producing a focus error signal accordingly; and

drive means for driving said objective lens based on said focus error signal.

4,886,363

QUADRATIC FREQUENCY MODULATED ABSOLUTE DISTANCE MEASURING INTERFEROMETRY

Robert K. Jungquist, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Sep. 6, 1988, Ser. No. 240,651

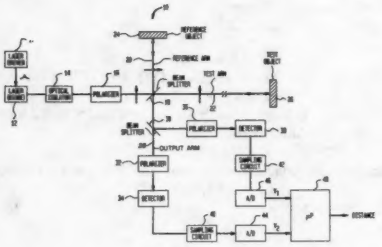
Int. Cl.[4] G01B 9/02

U.S. Cl. 356—349 6 Claims

1. In an absolute distance measurement interferometry method of the type employing frequency modulation of a laser

beam and detecting a beat frequency produced at the output of the interferometer to determine absolute distance to a test object, the improvement comprising the steps of:

a. quadratically modulating the frequency of the laser beam; and



b. detecting the rate of change of a beat frequency produced at the output of the interferometer to determine the absolute distance to the test object.

4,886,364

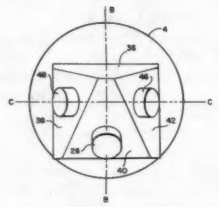
RING LASER GYROSCOPE BEAM COMBINER FOR SEPARATING AND COMBINING CIRCULATING LASER BEAMS FOR POWER AND FRINGE PATTERN DETECTIONS

Bo H. G. Ljung, Wayne, N.J., assignor to Kearfott Guidance & Navigation Corporation, Wayne, N.J.

Filed Apr. 6, 1987, Ser. No. 34,377

Int. Cl.[4] G01C *19/64*

U.S. Cl. 356—350 **8 Claims**



1. In a multi-axis ring laser gyroscope assembly having a plurality of cavities wherein corresponding pairs of counter propagating laser beams circulate, respective portions of the circulating laser beams escaping from each of the cavities, each of the cavities corresponding to one of the axes of the gyroscope assembly, respective movable mirror assemblies for controlling the pathlength of each pair of laser beams circulating in each of the cavities, the improvement comprising:

a plurality of beam combiner means;

wherein each beam combiner means is positioned at a respective junction where corresponding two of the plurality of cavities meet, respective laser beam portions of corresponding two pairs of laser beams circulating within the corresponding two cavities escaping from the two cavities at the respective junction, the beam combiner means separating and directing the escaped laser beam portions from one of the two pairs of circulating laser beams to a respective first and second facet thereof, the beam combiner means further combining and directing the escaped laser beam portions from the other of the two pairs of circulating laser beams to a third facet thereof, the beam combiner means having mounted thereon:

(a) separate monitor means at its respective first and second facets for individually monitoring the power of one of the separated laser beam portions of the one pair of circulating laser beams; and

(b) a fringe detector at its third facet for receiving the combined laser beam portions from the other pair of circulating laser beams to effect fringe patterns for the axis corresponding to the other pair of circulating beams.

4,886,365

DISTANCE MEASURING DEVICE

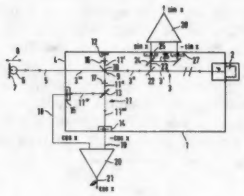
Gerd Ulbers, VS-Schwenningen, Fed. Rep. of Germany, assignor to Hommelwerke GmbH, VS-Schwenningen, Fed. Rep. of Germany

Filed May 31, 1988, Ser. No. 200,627

Claims priority, application Fed. Rep. of Germany, May 29, 1988, 3718192

Int. Cl.[4] G01B *9/02*

U.S. Cl. 356—351 **6 Claims**



1. A device for measuring the distance between the device and a measuring surface, comprising, in combination:

an optical interferometer, having a measuring wave guide, one end of which is connected to a laser, and the other end of which is directed to an optical measuring reflector positioned on or connected to the measuring surface, wherein the reflector reflects the laser light into the measuring wave guide;

a first reference wave guide provided in the interferometer intersecting the measuring wave guide at a first coupling point, the first reference wave guide having a mirror at one end, a first photoelectric converter at the opposing end, and a phase adjustment device between the coupling point and the first photoelectric converter; and

a first branch wave guide provided in the interferometer having one end coupled to the first reference wave guide by a first polarizing beam splitter located between the phase adjustment device and the first photoelectric converter, and a second photoelectric converter located at the opposing end of the first branch wave guide, wherein the phase of the light in the first branch wave guide is shifted relative to the phase of the light in the first reference wave guide and the outputs of the first and second photoelectric converters are connected to a first differential amplifier, whereby the first differential amplifier provides an output signal which is free from a direct current component and is fed into an indicator device for indicating the electrical output signal of the first and second photoelectric converters.

4,886,366

REFERENCE CORRECTED COLOR SENSOR

Yasuo Kogure, Tokyo, Japan, assignor to Hoya Corporation, Tokyo, Japan

Filed Dec. 10, 1987, Ser. No. 131,489

Claims priority, application Japan, Dec. 10, 1986, 61-2292454

Int. Cl.[4] G01N *21/27;* G01J *3/46*

U.S. Cl. 356—406 **3 Claims**

1. A color sensor comprising

a first detecting unit and a second detecting unit, each of said detecting units separating respectiv received beams into

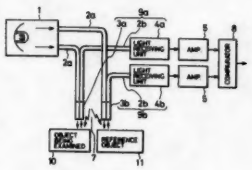
three color components and measuring respective quantities of light of said color components;

a reference object;

an object being examined;

means for illuminating said reference object and said object being exmined with light;

first means for directing a portion of said light reflected from said reference object to said first detecting unit;



second means for directing a portion of light reflected from said object being examined to said second detecting unit; and

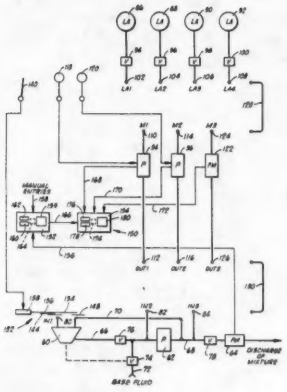
means for comparing corresponding pairs of said measured quantities of light of said color component produced by said first and second detecting units, thereby correcting a measured color of said object being examined.

4,886,367

APPARATUS FOR ADDING A SELECTED ADDITIVE INTO A MIXTURE

Dale E. Bragg; Mark A. Clark, and Randy G. Fleming, all of Duncan, Okla., assignors to Halliburton Company, Duncan, Okla.

Filed May 27, 1988, Ser. No. 200,085
Int. Cl.[4] B01F *15/02*
U.S. Cl. 366—132 **16 Claims**



1. An apparatus for adding a selected additive into a mixture, comprising:

first container means for storing a first additive, said first container means including a first additive outlet;

second container means for storing a second additive, said second container means including a second additive outlet;

first metering means for moving a substance at a controlled rate, said first metering means including a first metering inlet and a first metering outlet;

second metering means for moving a substance at a controlled rate, said second metering means including a second metering inlet and a second metering outlet;

mixing means for mixing a plurality of substances into a mixture, said mixing means including a plurality of additive inlets;

first connector means for changeably connecting the respective additive outlet of a selected one of said first and second container means to the respective metering inlet of a selected one of said first and second metering means for communicating the respective additive from the selected one of said first and second container means to the selected one of said first and second metering means to be the substance moved thereby; and

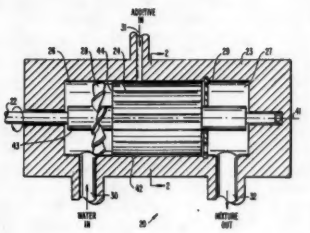
second connector means for changeably connecting the respective metering outlet of the selected one of said first and second metering means to a selected one of said plurality of additive inlets of said mixing means for communicating the selected one of said first and second metering means with said mixing means through the selected one of said plurality of additive inlets, thereby for providing the respective additive of the selected one of said first and second container means as a substance to be mixed in said mixing means.

4,886,368

ROTARY MIXER

L. Tony King, Long Beach, Calif., assignor to Koma. Systems, Inc., Long Beach, Calif.

Continuation-in-part of Ser. No. 34,672, Apr. 6, 1987, Pat. No. 4,793,713. This application Aug. 13, 1987, Ser. No. 84,839
Int. Cl.[4] B01F *7/00, 15/02*
U.S. Cl. 366—150 **9 Claims**

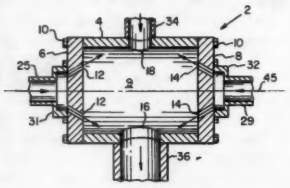


1. A mixing device for the mixing of two or more liquids comprising a shell body having upstream and downstream ends and an internal cavity, said cavity having a longitudinal axis and substantially circular cross section, a shaft rotatably housed within said shell body and having a longitudinal axis which coincides with said longitudinal axis of said internal cavity, said shaft having slotted grooves configured along a portion of its surface for receiving the liquids to be mixed from inlets located within the shell body, a narrow annular gap region formed between the outer surface of the shaft and the inner surface of the internal cavity in the portion of the shaft containing said slotted grooves such that said liquids tend to smear in said narrow angular gap region, a drive shaft for connection to a suitable device for rotating said shaft within said internal cavity and inlet means located within said shell body for the introduction of two or more liquids to be mixed proximate the upstream end of said shell body and a liquid exit means located proximate the downstream end of said shell body for removing said two or more liquids.

4,886,369
CONTINUOUS STATIC MIXING APPARATUS

Paul M. Hankison, Peters Township, Washington County, Pa., assignor to ACT Laboratories, Inc., McMurray, Pa.

Filed May 9, 1989, Ser. No. 348,973
Int. Cl.[4] B01F 15/02
U.S. Cl. 366—165 8 Claims



1. A mixing apparatus comprising an elongated cylindrical mixing chamber having a hollow body, first and second outside end walls attached at each outside end thereto and closing off said hollow body, with no portion of said hollow body extending outwardly beyond said end walls, and a discharge port extending through said body and into said mixing chamber, said discharge port positioned longitudinally on said hollow body between said end walls, with each end wall having an inner face, an opposed outer face, and a plurality of nozzle bores extending therethrough into the mixing chamber between said inner face and outer face and spaced about the center of each said end wall, with the inner face of each end wall directed toward the inner face of an opposed end wall, and a mounting collar affixed to and extending outwardly from an outer face of each of said end walls, with said mounting collars surrounding said plurality of nozzle bores in said associated end wall and having an inner diameter only large enough to completely enclose the nozzle bores, with said bores each diverging outwardly toward said body and at an angle relative to the longitudinal axis of the chamber as the bore extends from said outer face to said inner face, with said bores being skewed with respect to a radial line extending outwardly from the center of said end walls, and with said bores of each end wall being skewed in the same direction, such that a fluid entering through the nozzle bores of one end wall will contact and mix thoroughly within said mixing chamber with a fluid entering through the nozzle bores of the other end wall and the mixed fluids will exit said mixing chamber through said discharge port, whereby fluids passing through said bores have a component of motion outwardly toward said body of said mixing chamber, a component of motion inwardly toward an opposite end wall, a rotary component of motion relative to the radius of said mixing chamber, and a rotary component of motion in a direction opposite to that of fluids passing through the bores of an opposite end wall.

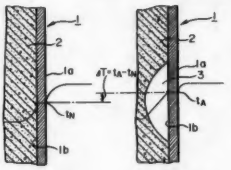
4,886,370
METHOD FOR DETECTING A STATE OF SUBSTANCE EXISTING IN PIPE

Toshio Koshihara; Rokurou Misawa; Yuzo Sagawa, and Kimio Takehara, all of Tokyo, Japan, assignors to NKK Corporation, Tokyo, Japan

Filed Aug. 8, 1988, Ser. No. 229,835
Claims priority, application Japan, Aug. 25, 1987, 62-209311; Mar. 18, 1988, 63-64820
The portion of the term of this patent subsequent to Oct. 10, 2006, has been disclaimed.
Int. Cl.[4] G01N 25/72
U.S. Cl. 374—5 6 Claims

1. A method for detecting a position of occurrence of a cavity at a neck portion of a pipe, the outer surface of which is exposed, comprising:

heating a pipe having a neck portion where the cross-sectional area of said pipe is sharply reduced, the outer surface of which is exposed, from the side of the outer surface thereof so that a difference in temperature is produced between a portion of the outer surface of said pipe corresponding to a portion of the inner surface thereof, which is in contact with a liquid flowing through said pipe, and a portion of the outer surface of said pipe corresponding to a portion of the inner surface thereof at said neck portion, which is not in contact with said flowing liquid under the effect of intervention of a cavity caused by a sudden increase in flow velocity of said liquid passing through said neck portion; then



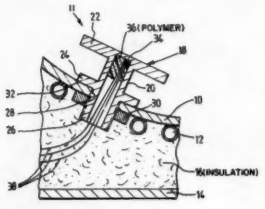
shooting the outer surface of said pipe by means of a thermal imaging system while said difference in temperature still remains on the outer surface of said pipe to obtain a thermal image of said difference in temperature, which has a portion showing a higher temperature, corresponding to the portion of the inner surface of said pipe, which is not in contact with said flowing liquid; and

detecting a position of occurrence of said cavity at said neck portion of said pipe by means of said thermal image thus obtained.

4,886,371
SENSOR FOR MEASURING THE INTERNAL TEMPERATURE OF A CENTRIFUGE CELL

Jean L. Fondin, 15, rue Guillaume Apollinaice, Saint Nazaire, France

Filed Aug. 18, 1988, Ser. No. 233,676
Claims priority, application France, Aug. 18, 1987, 87 11674
Int. Cl.[4] B04B 15/00; G01K 1/16, 13/02
U.S. Cl. 374—141 8 Claims



1. A temperature sensor for measuring the internal temperature of a thermostatically controlled centrifuge cell, the sensor comprising:

a metallic element including

(i) a flange adapted to be fixed in intimate contact against an area of an internal wall of the cell, in direct heat transfer relation with said internal wall, and

(ii) a widened portion spaced from said flange, including a lateral surface having a surface area significantly larger than the area of contact between the flange and the internal wall of the cell, and adapted to be positioned inside the centrifuge cell in heat transfer relation with the atmosphere therein,

the metallic element forming an internal bore; and

a temperature responsive probe secured in said internal bore in heat transfer relation with the metallic element to sense,

and to generate a signal indicative of, the temperature of the metallic body.

4,886,372

CONTROLLED RIPENING OF PRODUCE AND FRUITS

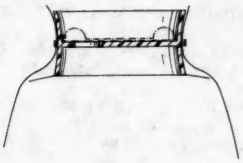
Michael Greengrass, "Evergreen" Newton Street, Newton St. Faith, Norwich Norfolk, and Anthony L. Allen, 12 Colindeep Lane, Norwich Norfolk, both of United Kingdom

Filed Feb. 18, 1988, Ser. No. 157,412

Claims priority, application United Kingdom, Feb. 19, 1987, 8703917; Jul. 3, 1987, 8715756; Aug. 7, 1987, 8718791

Int. Cl.[4] B65D *33/01*

U.S. Cl. 383—100 6 Claims



1. A flexible, semi-rigid or rigid plastics material container, bag or encasement for produce, said container, bag or encasement having a selected size and number of at least one opening therein for controlling modified atmosphere within the container, bag or encasement and thereby delaying ripening of the produce, when located within the container, bag or encasement.

wherein the container, bag or encasement comprises a body region and a neck region, and the at least one opening is provided in such neck region,

wherein dial means are associated with the neck region of the container, bag or encasement,

whereby a dialable size of said at least one opening may be selected, and the modified atmosphere within the container, bag or encasement can be variably controlled, thus enabling the same container, bag or encasement to be used for different product or a variety of products or for various temperature requirements.

4,886,373

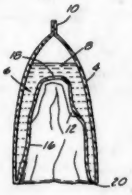
SELF-SUPPORTING, FLEXIBLE, DISPENSING PACKAGE

Arthur P. Corella, 8166 Vanscoy, North Hollywood, Calif. 91602

Filed Aug. 17, 1987, Ser. No. 85,776

Int. Cl.[4] B65D *5/50*

U.S. Cl. 383—104 20 Claims



1. A peripherally sealed, flexible, dispensing package having a self-supporting, stand-up configuration, said package comprising:

(a) a circumferential, outer flexible wall that defines a compartment which contains fluidic material;

(b) an inverted portion of said flexible wall extending into said compartment and defining an inverted inner wall; and

(c) a self-supporting rim formed by the confluence of the outer flexible wall with the inverted inner wall, and

(d) wherein the outer flexible wall and the inverted inner wall are in spaced relationship and there is no flattening of the inverted portion due to the load of the fluidic material in the self-supporting mode.

4,886,374

LINEAR GUIDE APPARATUS

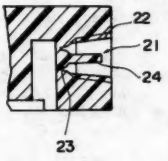
Nobuyuki Osawa, Takasaki, Japan, assignor to Nippon Seiko Kabushiki Kaisha, Tokyo, Japan

Filed Nov. 10, 1988, Ser. No. 269,673

Claims priority, application Japan, Nov. 18, 1987, 62-176183[U]

Int. Cl.[4] F16C *29/06*

U.S. Cl. 384—13 1 Claim



1. In a linear guide apparatus comprising a guide rail extending in an axial direction and having axially extending rolling member rolling grooves formed in both sides, a slider main body mounted on said guide rail, and axially movable with respect to said guide rail, having rolling member rolling grooves formed in inner surfaces of both side walls respectively corresponding to the rolling member rolling grooves of said guide rail, and having through holes, as rolling member paths, formed respectively in the side walls in parallel to the rolling member rolling grooves of said side walls, end caps joined to opposite ends of said a slider main body, each of said end caps having a pair of rolling member circulating paths curved in a semicircular shape for respectively bringing the rolling member paths in communication with the rolling member rolling grooves, further having an oil feed groove for supplying oil to the rolling member circulating paths, and rolling members inserted rollably into the opposing rolling member rolling grooves of said guide rail and said slider main body, and into the rolling member paths and the rolling member circulating paths, wherein an improvement comprises:

a blind hole, for mounting an oil feed member, formed in a side of each of the end caps, the bottom of said blind hole located close to said oil feed groove, and said hole bottom adapted to be removed, if necessary, to bring said blind hole in communication with said oil feed groove.

4,886,375

DUST-PROOF COVER FOR LINEAR GUIDE

Toru Tsukada, Gumma, Japan, assignor to Nippon Seiko Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 9, 1989, Ser. No. 320,982

Claims priority, application Japan, Mar. 9, 1988, 63-31442[U]

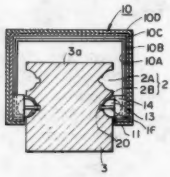
Int. Cl.[4] F16C *29/06*

U.S. Cl. 384—15 2 Claims

1. A dust-proof cover for a guide rail of a linear guide apparatus including a guide rail having a plurality of axially extending ball rolling grooves in each of both side surfaces, and a slider mounted on said guide rail, for movement in the axial direction, through rolling members inserted between said slider and said guide rail, said dust-proof cover comprising:

a telescopic cover main body, having an upper surface and

downwardly extending side walls, covering an upper surface and said plurality of ball rolling grooves of each side surface of said guide rail, said telescopic cover main body extensible and contractible in said axial direction and having an open bottom portion with axially extending side edge portions along both sides of the open bottom portion formed by bending the lower end portions of said down-



wardly extending side walls of said telescopic cover main body inwardly; and

a plurality of rolling members, each said side edge portions and protruding into one of said plurality of ball rolling grooves, positioned at a lower side to be fitted thereinto, thereby to allow said telescopic cover main body to extend and contract while guided by said rolling members rolling in said ball rolling grooves.

4,886,376

DUST-PROOF SEAL FOR LINEAR GUIDE APPARATUS

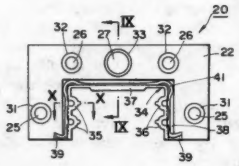
Nobuyuki Osawa, Takasaki, Japan, assignor to Nippon Seiko Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 14, 1988, Ser. No. 167,396

Claims priority, application Japan, Mar. 13, 1987, 66-36886[U]

Int. Cl.[4] F16C *29/06*

U.S. Cl. 384—15 **5 Claims**



1. A dust-proof seal used in a linear guide apparatus which includes a guide rail elongated in an axial direction and having ball roller grooves respectively formed in outer surfaces of opposite side walls, a slider mounted movably on said guide rail and having ball roller grooves respectively formed in inner surfaces of opposite side walls, a multiplicity of balls rollably interposed between the ball rolling grooves of said guide rail and the ball rolling grooves of said slider, and a pair of end caps attached respectively to axial opposite ends of said slider and having respectively ball circulating paths formed therein, said dust-proof seal comprising:

a rigid plate attached to one of said pair of end caps, said plate having an opening to allow said guide rail to pass therethrough;

a flexible member adhered to said plate and having a plurality of lip portions protruding inwardly beyond an inner edge of said opening of said plate, said flexible member having a protruding portion extending inwardly beyond said inner edge of said opening of said plate, a channel formed in said flexible member at a periphery of said lip portions and said protruding portion; and

a pressing member mounted on a channel formed in said flexible member at a periphery of said lip portions for pressing said lip portions and said protruding portion elastically against a surface of said guide rail, being held within said channel, said pressing member essentially having an inverted U-shape and comprising two standing portions, two lower portions at the ends of said standing portions and a lateral portion connecting the upper portions of said standing portions;

wherein, said two standing portions are curved inward and said lateral portion is curved downward, such that said pressing member presses said lip portions and said protruding portion, and said pressing member is supported at substantially all portions by said rigid plate in the axial direction of said guide rail.

4,886,377

ROTARY BODY OF HARD MATERIAL WITH PLASTIC SUPPORTER

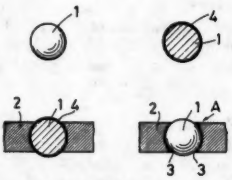
Minoru Adachi, Ikoma, and Takashi Kizawa, Kyoto, both of Japan, assignors to Adachishin Industrial Co., Ltd., Osaka, Japan

Filed Dec. 17, 1987, Ser. No. 134,129

Claims priority, application Japan, Dec. 18, 1987, 61-302456

Int. Cl.[4] F16C *43/06, 29/04, 33/46*

U.S. Cl. 384—49 **15 Claims**



1. A product by process for forming a bearing construction having at least one rotary body, which comprises coating said at least one rotary body with a removable coating film having a thickness of from about 8μ to about 15μ, positioning said at least one coated rotary body within a fixedly supporting holder means with at least a portion of said at least one coated rotary body arranged to extend beyond at least one surface of said holder means, and removing said removable coating film from said at least one coated rotary body, thereby leaving a spacing of from about 2 μm to about 6 μm between said at least one rotary body and said holder means in order to form said bearing construction with a spacing between said at least one rotary body and said holder means for free rotation of said at least one rotary body relative to said holder means.

4,886,378

THRUST BEARING DEVICE

Kozo Matake, Kanagawa, Japan, assignor to Ebara Corporation, Tokyo, Japan

Filed Dec. 30, 1988, Ser. No. 292,011

Claims priority, application Japan, Jan. 14, 1988, 63-3172

Int. Cl.[4] F16C *17/06*

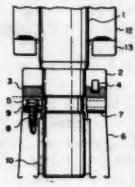
U.S. Cl. 384—308 **3 Claims**

1. A thrust bearing device for an electric motor lubricated by liquid within a motor casing comprising;

a sliding disk having a sliding surface; and

a sliding shoe member provided with plural sliding shoes unitarily supported on a common base through respective ribs, each shoe having a flat sliding surface coplanar with the surfaces of the other shoes and adapted to slidably contact said sliding surface of said sliding disk, either one of said sliding disk or said sliding shoe member being arranged to be the stationary side of the thrust bearing

device and disposed on a motor bracket with an elastic sheet interposed therebetween and the other being arranged to be the rotary side of the thrust bearing device and fixed to a motor shaft.



4,886,379

CAGE FOR BALL BEARINGS

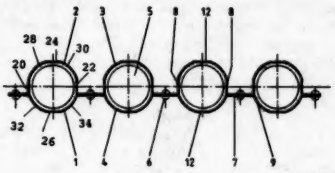
Oswald Bayer, Aidhausen, Fed. Rep. of Germany, assignor to FAG Kugelfischer Georg Schafer (KGaA), Fed. Rep. of Germany

Filed Oct. 13, 1987, Ser. No. 108,096

Claims priority, application Fed. Rep. of Germany, Nov. 27, 1986, 3640663

Int. Cl.[4] F16C *33/42*

U.S. Cl. 384—523 **4 Claims**



1. A cage for a ball bearing, the cage comprising first and second ring parts which are connected to each other to define a complete ring for extending around the ball bearing, the first and second ring parts are each ridge shaped, each ring part having axially projecting ridges defined in an array spaced circumferentially around the ring part, with each ridge defining an open pocket section, and the ridges being so placed around the ring parts that with the ring parts connected to each other, a respective ridge on each ring part which defines a pocket section cooperates with a respective ridge on the other ring part which defines a pocket section to together define a pocket in which a ball of the bearing may be received;

the ring parts being shaped so that their place of separation, where the ring parts are connected together, is shifted axially toward one of the ring parts, so that the ridges of the second ring part axially project taller than the ridges of the first ring part; the axially taller ridges of the second ring parts are shaped so that they have first, substantially flat ball stop surfaces at both circumferentially opposite ends of the ridge; the first flat ball stop surfaces lie generally in a transverse plane defined by the centers of the balls held in the pocket sections; the ridges of both of the ring parts are shaped so that, at the axially outward end of each of the ridges, the pocket sections have second, substantially flat ball stop surfaces at the axially deepest parts of the ridges, whereby there are respective second at least axially flat ball stop surfaces at the axially opposite sides of the resulting pocket sections, and the first and second ring parts having respective arcuate inner surfaces, the inner surfaces of the second ring part extending between its first and second flat ball stop surfaces and the inner surfaces of the first ring part being located other than at said second flat surface, the circumferential lengths of the first and second substantially float surfaces being comparable to the corresponding lengths of the arcutate inner surfaces.

4,886,380

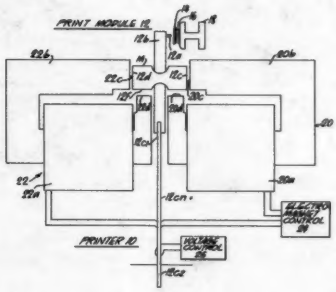
PIEZOELECTRIC CONTROLLED ELECTROMAGNETICALLY DRIVEN PRINTING

Mosi Chu, Setauket, N.Y., assignor to Primages, Inc., Ronkonkoma, N.Y.

Filed Sep. 1, 1987, Ser. No. 91,835

Int. Cl.[4] B41J *3/10*

U.S. Cl. 400—121 **13 Claims**



1. Dot-matrix printer comprising:

a platen for supporting a record medium;

a first print module, said first print module comprising

a first module subassembly comprising

a first bendable piezoelectric lamina having first and second edges,

first mounting means for fixedly supporting said first bendable piezoelectric lamina along a region of said first edge,

a first planar ferromagnetic member,

first connecting means for operatively connecting said first planar ferromagnetic member to said first bendable piezoelectric lamina at a region remote from said first edge, and

a first dot print element fixedly connected to said first module subassembly for following all movements of said first first bendable piezoelectric lamina;

a second print module, said second print module comprising

a second module subassembly comprising

a second bendable piezoelectric lamina having first and second edges,

second mounting means for fixedly supporting said second bendable piezoelectric lamina along a region of said first edge,

a second planar ferromagnetic member,

second connecting means for operatively connecting said second planar ferromagnetic member to said second bendable piezoelectric lamina at a region remote from said first edge, and

a second dot print element fixedly connected to said second module subassembly for following all movements of said second bendable piezoelectric lamina;

energizing means for selectively energizing selected of said bendable piezoelectric laminas to move between first and second positions; and common electromagnetic drive means positioned to apply a magnetic force directly to planar ferromagnetic members for attracting only those planar ferromag-

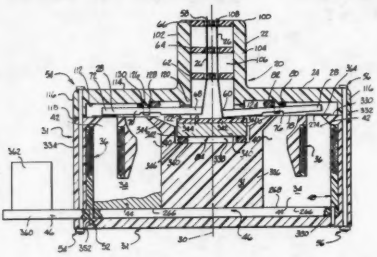
netic members whose associated bendable piezoelectric lamina are in said second position toward said platen with sufficient pressure to cause dots to be printed by the dot print elements connected to those module subassemblies.

4,886,381

DOT MATRIX PRINT HEAD ASSEMBLY

Kevin T. Kersey, San Diego, Calif., assignor to D. H. Technology, Inc., San Diego, Calif.

Filed May 6, 1988, Ser. No. 185,390
Int. Cl.[4] B41J *3/12*
U.S. Cl. 400—124 **53 Claims**



1. A matrix print head assembly comprising:

a number of print wire members spaced about a central longitudinal axis and being longitudinally movable between a non-print position and a print position;

wire guide housing means for movably supporting said wire members;

a number of rigid armature members equal to the number of wire members movable between a non-print position and a print position and extending radially outwardly of and being circumferentially spaced about the central longitudinal axis with a radially inner portion being driveably associated with said wire members during movement from the non-print position to the print position to drive the wire members from the non-print position to the print position;

a number of separate circumferentially spaced electromagnet means equal to the number of armature members mounted in juxtaposition to a radially outer portion of said armature members for pivotally supporting said armature members during movement from the non-print position to the print position and being selectively energizable for causing pivotal movement of the radially outer portion of said armature members toward said electromagnet means and opposite pivotal movement of the radially inner portion of said armature members from the non-print position to the print position by magnetic force applied to the radially outer portion;

electromagnetic drive housing means for supporting said electromagnet means in operative relationship with said armature means;

armature retainer flange means on said wire guide housing means for retaining said armature members in operative association with said electromagnet means;

said armature members being positioned between said electromagnet means and armature retainer flange means and said radially innermost portion being movable away from said electromagnetic means toward said armature retainer flange means during movement from the non-print position to the print position;

pivotal support means for continuously pivotally supporting said armature members during the movement of said armature members from the non-print position to the print position;

said pivotal support means comprising a transverse pivotal edge means on each of said said armature members and a flat pivot edge support surface means on said electromagnetic means;

each of said electromagnetic means comprising a radially innermost first pole portion and a radially outermost second pole portion being radially spaced from one another, the first pole portion being next adjacent said wire members and having a flat first pole end surface located adjacent said armature members, the second pole portion being spaced outwardly of said first pole portion a distance further away from said wire members than the distance between said first pole portion and said wire members, and the second pole portion having a flat second pole end surface located adjacent said armature members and being effective to actuate said armature members from the non-print position to the print position;

said pivot edge support surface means comprising said flat first pole end surface of said first pole portion next adjacent said wire members;

first armature retaining guide means in said flange means located radially next adjacent said wire members and located between said wire members and said pivotal support means for guidably supporting said armature members during movement between said non-print position and said print position;

second armature retaining guide means in said flange means located radially outwardly of said first armature retaining guide means and radially inwardly of said pivotal edge means for guidably supporting said armature members during movement between said non-print position and said print position;

a first resilient compressible support means for continuously engaging said armature members and being located radially inwardly of said pivotal edge means and between said first armature retaining guide means and said second armature retaining guide means; and

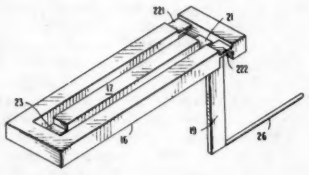
a second resilient compressible support means for engaging said armature members radially outwardly of said first resilient compressible support means and said pivotal edge means and for applying a force to said armature members opposite to the direction of movement of said armature members from the non-print position to the print position.

4,886,382

PRINTING HAMMER COMPRISING TWO HINGE PARTS COUPLING AN ARM TO A BASE MEMBER ON BOTH SIDES OF A HINGE COUPLING THE ARM TO A PIEZOELECTRIC ACTUATOR

Takashi Oota, and Tadao Uchikawa, both of Tokyo, Japan, assignors to NEC Corporation, Tokyo, Japan

Filed Feb. 8, 1988, Ser. No. 153,371
Claims priority, application Japan, Feb. 9, 1987, 62-28534; Feb. 9, 1987, 62-28535; Mar. 6, 1987, 62-52326; Mar. 6, 1987, 62-52327; Aug. 31, 1987, 62-218235; Aug. 31, 1987, 62-218236
Int. Cl.[4] B41J *3/12*
U.S. Cl. 400—124 **14 Claims**



1. In a printing hammer comprising a base member, a piezoelectric actuator having a base end, a free end, and an actuator axis passing through said base and said free ends and having a rest state and an actuated state of extending and contracting along said actuator axis, an arm having a first line, a second line

parallel to said first line, and an end point, a printing wire fixed to said end point, coupling means for coupling said base end to said base member, a first resilient hinge coupling said free end to said first line, and a second resilient hinge coupling said second line to said base member, the improvement wherein said second resilient hinge comprises a first and a second resilient part which couple said second line to said base member on both sides of said first resilient hinge and which are on a single plane when said piezoelectric actuator is in said rest state.

4,886,383

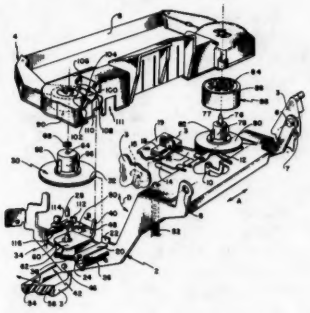
TAPE CASSETTE FOR METERING CORRECTION TAPE FEED

Hans W. Mueller, Cortland, N.Y., assignor to Smith Corona Corporation, Cortland, N.Y.

Filed Feb. 29, 1988, Ser. No. 161,870

Int. Cl.[4] B41J *32/00*

U.S. Cl. 400—208 **15 Claims**



1. A tape cassette for removable mounting in a typewriter, the typewriter having a tape feed mechanism including a movable metering post, the tape cassette having a supply spool carrying a supply of tape and having a take-up spool for receiving tape from the supply spool, the tape cassette comprising a sensing member corresponding to a particular type of correction tape mounted therein for sensing the amount of tape on said take-up spool and being engaged by the movable metering post for determining the amount of the particular type of correction tape to be fed by the tape feed mechanism.

4,886,384

RIBBON CASSETTES

Alan Harry, Melbourn, England, assignor to Francotyp-Postalia GmbH, Berlin, Fed. Rep. of Germany

Division of Ser. No. 818,656, Jan. 14, 1986, Pat. No. 4,767,228. This application Jul. 20, 1988, Ser. No. 221,659

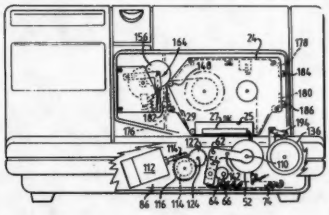
Claims priority, application United Kingdom, Jan. 19, 1985, 8501404

Int. Cl.[4] B41J *33/14*

U.S. Cl. 400—223 **5 Claims**

1. A method of printing an article at a printing station using a thermal print head and a ribbon of thermally activatable dye, comprising the steps of:

producing relative movement between the print head on the one hand and the article to be printed and the ribbon on the other hand, wherein adhesion between the article and the ribbon is created by local heating of the ribbon, and using said adhesion for driving the ribbon past the print head from a supply spool to a take-up spool, thereby ensuring



synchronism of movement between the article and the ribbon.

4,886,385

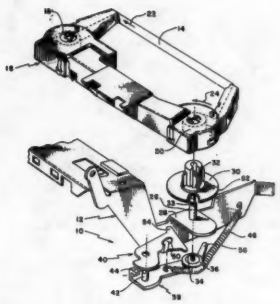
RIBBON TENSIONING MECHANISM

Samuel D. Cappotto, Syracuse, N.Y., assignor to Smith Corona Corporation, Cortland, N.Y.

Filed Jun. 27, 1988, Ser. No. 211,936

Int. Cl.[4] B41J *33/52*

U.S. Cl. 400—234 **7 Claims**



1.A ribbon tensioning mechanism comprising, in combination:

a frame;

a supply spool carrying a roll of ribbon;

ribbon take up spooling means for exerting tension on the ribbon in a first direction to unwind the ribbon from said supply spool;

a shaft mounted on said frame;

a toothed hub rotatably mounted on said shaft, said supply spool mounted on said toothed hub for rotation therewith;

an operating arm mounted on said shaft for rotation coaxially with the said toothed hub;

a pawl rotatably mounted on said arm, remote from the said supply shaft axis, said pawl having a pawl tooth for engaging the teeth on said toothed hub;

biasing means for biasing said arm and said pawl tooth into engagement with the teeth on said toothed hub and for causing the pawl to bias said toothed hub and said supply spool about said shaft for exerting and maintaining tension on the ribbon in a second direction opposite from said first direction;

disengaging means for positively disengaging said pawl tooth from said toothed hub, including rotation of said operating arm about said ribbon supply shaft axis which causes subsequent rotation of said pawl and pawl tooth about a fixed point axis on the operating arm, distinct from said supply shaft axis, which thus removes the tension from said toothed hub and the ribbon in said second direc-

tion in response to tension on the ribbon in said first direction to allow said supply to unwind with minimum resistance to reduce ribbon tension; and

said biasing means operatively connected to said disengaging means for re-engaging said pawl tooth with said toothed hub in response to said disengagement of said pawl tooth from said toothed hub for maintaining tension on the ribbon in said second direction.

4,886,386

INK RIBBON HAVING ELASTOMERIC PROTECTIVE BACKING

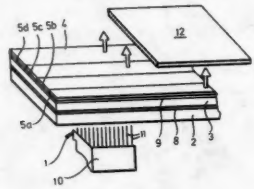
Hans Paffhausen, Franklin, Tenn.; Ian Hogarth, Turriff, Scotland; Andrew Scott, Turriff, Scotland, and Christine Mackintosh, Turriff, Scotland, assignors to Caribonum Ltd., Turriff, Scotland

Filed Sep. 30, 1987, Ser. No. 103,528

Claims priority, application Fed. Rep. of Germany, Oct. 15, 1986, 3635112

Int. Cl.[4] B41J *31/12*

U.S. Cl. 400—241.4 **7 Claims**



1. A printing system which comprises:

a matrix printing head with a multiplicity of needles deployable for generating an image; and

an overlapping overstrike ribbon cooperating with said head for forming said image, said ribbon comprising:

a synthetic resin carrier film having a side turned toward said head and another side turned away from said head,

a cross-linked elastomer layer coated on said side turned toward said head and engageable by said needles, said elastomer layer having a resiliency sufficient to prevent penetration of said needles into said ribbon but enabling transfer of impact through said elastomer layer and said film affording high definition of said image, and

a color-release layer on said another side of said carrier film and comprising a synthetic resin matrix and at least one ink material of at least one color, said color-release layer being capable of transferring said image to a color-receiving surface.

4,886,387

COSMETIC CONTAINER AND APPLICATOR

Ronald N. Goldberg, Coram; Eugene G. Mavroudis, Dix Hills, and Susan H. Ferguson, Coram, all of N.Y., assignors to Estee Lauder, Inc., New York, N.Y.

Filed Jun. 1, 1984, Ser. No. 616,126

Int. Cl.[4] A45D *40/00*

U.S. Cl. 401—122 **29 Claims**

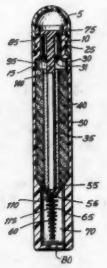
1. A cosmetic container and applicator comprising:

(a) a container having an opening at its top for reciprocably receiving the applicator specified in subparagraph (b) hereof;

(b) an applicator comprising a brush at its bottom and an elongated rod that extends longitudinally upwardly from the brush;

(c) an upper wiper element, said upper wire element comprising a wiping surface that defines a first opening through which the elongated rod and brush of the applicator may pass, the first opening in said upper wiper element being dimensioned to engage the brush to remove excessive makeup from the brush when the brush is moved out of the container;

(d) a lower wiper element, said lower wiper element being positioned further from the opening of the container than the upper wiper element, said lower wiper element dividing the container into a top chamber and a bottom chamber, and having a wiping surface which defines a second



opening through which the brush may pass, said second opening having a smaller dimension than that of the first opening, said second opening being dimensioned to engage the brush as it passes through the opening so as to remove substantially all of the makeup from said brush as it is passed therethrough, and further wherein said top chamber contains makeup.

4,886,388

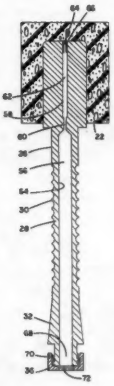
CLEANSER DISPENSING SPONGE SYSTEM

Stuart P. Gulker, Stone Hill Rd., Pound Ridge, N.Y. 10576, and Stanley Gulker, 6 Mark Dr., Spring Valley, N.Y. 1-977

Continuation-in-part of Ser. No. 37,524, Apr. 13, 1987, abandoned. This application Jul. 28, 1988, Ser. No. 225,640

Int. Cl.[4] B43M *11/06*; A47L *13/26*

U.S. Cl. 401—148 **4 Claims**



1. A. cleanser dispensing sponge comprising:

a housing, including a first end, a second end, said first end comprising a head, said housing further including a reservoir located within the housing and occupying a substantial portion of the length of the housing between the head and the second end, with the back of the reservoir located at said second end, and the front toward said head,

said reservoir including a filler opening at said second end

for loading cleanser into the cleanser dispensing sponge, and

rigid cap means at said second end for sealing said filler opening,

sponge means for mounting on said head, said sponge means including resilient and fluid conducting properties,

a cleanser delivery system located within the housing, said system comprising a pumping canal for receiving hydraulic pumping pressure from the sponge means, said canal being substantially straight, located along a line taken from the first end of the housing to the second end of the housing, and including a first opening and a second opening, said second opening being in fluid transmitting communication with the reservoir, said first opening being at said first end through an outer surface of the head within the sponge means for receiving liquid from, and for delivering liquid to, said sponge means in response to said hydraulic pumping pressure, and

a metering constriction of a portion of the pumping canal, located at the second opening, for controlling liquid flow to and fro between said system and said reservoir in response to said hydraulic pumping pressure, said metering constriction defining an orifice for said second opening, said constriction being a molding with said head, and

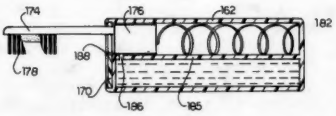
said canal being longer than its diameter, and being a molding with said head.

4,886,389

TOOTHBRUSH

Gerda Vidovic, 446-3rd Street, South, Kenora, Ontario, Canada P9N 1J1

Filed Oct. 13, 1987, Ser. No. 108,050
Int. Cl.[4] A45D *44/18*; A46B *11/04*
U.S. Cl. 401—191 **5 Claims**



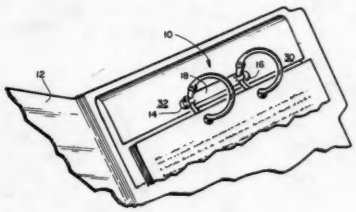
1. A toothbrush comprising a container; a reservoir contained within said container; a liquid dentifrice in said reservoir; a brush chamber in said container; a brush including a brush back, a liquid absorbent pad on one side of the back, bristles projecting from said one side of the back adjacent at least part of the pad and a plunger secured to the brush back, the plunger being slideable in the brush chamber between a stored condition with the brush housed in the brush chamber and an extended condition with the brush projecting from the brush chamber; spring means for biasing the plunger towards the extended condition; a cover slideably mounted on one end of the container for selectively covering an end of the brush chamber and retaining the brush in the stored condition; an aperture through a wall between the reservoir and the brush chamber, opening into the brush chamber at a position adjacent the absorbent pad when the brush is housed in the brush chamber; and a valve plate slideably mounted on the wall, normally overlying the aperture, and being prevented from moving to a position opening the aperture when the cover extends over the end of the brush chamber.

4,886,390

LOOSE LEAF BINDER

Joseph A. Silence, 9742 Pebble Beach Dr., and Randolph Torres, 9747 Pebble Beach Dr., both of Santee, Calif. 92071

Filed Oct. 17, 1988, Ser. No. 258,516
Int. Cl.[4] B42F *3/00, 13/00, 5/00, 13/20*
U.S. Cl. 402—80 R **6 Claims**



1. A loose leaf fastener for temporary storage of perforated paper thereon comprising:

a base member having spaced apart bores equal in number and spaced distance to the perforations in said perforated paper, said bores being directed parallel to each other and transverse to the longitudinal dimension of said base member;

a circumferential split ring pivotal between ring open and ring closed positions loosely carried in each of said bores for freedom of side to side pivoting relative thereto toward and away from said base member; and

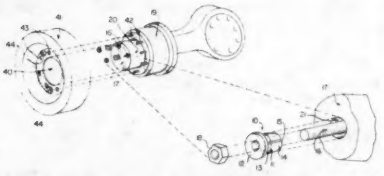
position locking means carried by said ring and located on each outer side of said bore for preventing said ring from rotating along its circumference relative to said bore.

4,886,391

ATTACHING MEANS AND METHOD

Frank D. Ragsdale, Sr., Rte. 11, Box 387, Winston-Salem, N.C. 27107

Filed Jan. 20, 1988, Ser. No. 146,176
Int. Cl.[4] F16B *17/00*
U.S. Cl. 403—19 **8 Claims**



4. A means to attach a first structural member to a second comprising the combination of:

a. a threaded stud joined to a first structural member and positioned in an aperture defined by a second structural member,

b. an attaching means, said attaching means having a main body and a flange, said body including a conical portion and a cylindrical portion, said body portion defining a smooth longitudinal bore, said conical portion joined to said cylindrical portion and said cylindrical portion joined to said flange, said cylindrical portion having a diameter larger than the aperture defined by said second structural member, said conical portion sized to fit within the aperture, said body portion for positioning on said threaded stud, and

c. a tightening means for directing against said flange of said attaching means to urge said attaching means along the threaded stud into the defined aperture while maintaining said flange spaced from said second structural member to thereby hold said first structural member to said second

structural member and to allow convenient removal of said attaching means.

4,886,392

PRESS-FIT STRUCTURE OF A SHAFT

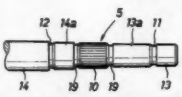
Masahiro Iio, Saitama, Japan, assignor to Diesel Kiki Co., Ltd., Tokyo, Japan

Filed Sep. 4, 1987, Ser. No. 93,004

Claims priority, application Japan, Sep. 30, 1986, 61-150599[U]

Int. Cl.[4] F16B *11/00*

U.S. Cl. 403—282 **3 Claims**



1. A press-fit structure of a shaft and a member having a shaft hole for fixedly receiving a shaft therein, said structure comprising:

a substantially cylindrical shaft having axially spaced apart leading, middle, and following portions, said leading and following portions being substantially plane and smooth, said middle portion being a meshing shaft portion having a plurality of axially extending meshing projections disposed on an outer surface thereof for cutting into an inner surface of a shaft hole of a member for cutting indentations therein and generating cut material therefrom for fixedly meshing said shaft with a shaft hole of a member when said shaft is press-fitted into a shaft hole thereof, said following portion having an outer diameter larger than an outer diameter of said middle meshing shaft portion, the diameter of said middle meshing shaft portion being larger than an outer diameter of said leading portion, an axial length of said leading portion being longer than an axial length of said meshing shaft portion and the axial length of said meshing shaft portion being longer than an axial length of said following portion for causing said meshing shaft portion to align coaxially with a shaft hole of a member when said shaft is press-fitted into a shaft hole thereof, and said shaft having first and second cut-grooves, said first cut-groove being between said leading portion and said meshing portion and having a diameter smaller than the diameter of said leading portion, said second cut-groove being between said meshing portion and said following portion and having a diameter smaller than the diameter of said meshing portion;

a member having a shaft hole for fixedly receiving said shaft therein, said shaft hole being substantially cylindrical and having axially spaced apart small auxiliary, main, and large auxiliary shaft hole sections, each one of said shaft hole sections being substantially plane and smooth, said large auxiliary shaft hole section having an inner diameter larger than an inner diameter of said main shaft hole section, the inner diameter of said main shaft hole section being larger than an inner diameter of said small auxiliary shaft hole section, the inner diameters of said small auxiliary, main, and large auxiliary shaft hole sections being sufficiently smaller than the said outer diameters of said leading, meshing, and following shaft portions, respectively, of said shaft for causing said shaft to be fixedly interference fitted with said shaft hole of said member when said shaft is press-fitted into said shaft hole, an axial length of said small auxiliary shaft hole section being substantially the same as the axial length of said leading shaft portion, an axial length of said main shaft hole section being substantially the same as the axial length of said meshing shaft portion, and an axial length of said large auxiliary shaft hole section being substantially the same as the axial length of said following shaft portion, and said shaft hole having first and second annular grooves, said first annular groove being between said small auxiliary shaft hole section and said main shaft hole section, said second annular groove being between said main shaft hole section and said large auxiliary shaft hole section, a diameter of each of said first and second annular grooves being larger than the diameter of said main shaft hole section, and an axial distance between said first and second annular grooves being substantially equal to the axial distance between said first and second cut-grooves for causing said first and second annular grooves to be respectively substantially aligned with said first and second cut-grooves when said shaft is press-fitted into said shaft hole, said first and second cut-grooves and said first and second annular grooves being collectively sufficiently large for collecting the cut material generated by said plurality of axially extending meshing projections on said meshing shaft portion cutting into the inner surface of said shaft hole of said member when said shaft is press-fitted into said shaft hole; and

wherein, the axial lengths of said following, meshing, and leading shaft portions increase in the direction of press-fitting said shaft into said shaft hole of said member, and said following shaft portion is press-fitted into said large auxiliary shaft hole section of said shaft hole last for crushinng any indentations cut into the inner surface of said large auxiliary shaft hole section by said plurality of axially extending meshing projections for tightly sealing said shaft hole.

4,886,393

PRETREATMENT OF SOLID WASTES, AND WASTES TO BE COMPACTED, FOR INTRODUCTION INTO UNDERGROUND SALT CAVITIES OF SALT CAVERNS VIA A DOWNPIPE UNDER THE FORCE OF GRAVITY

Wilhelm Jahn-Held, Staufenberg; Walter Lindoerfer, Kassel, and Friedel Wartenpfuhl, Giesen, all of Fed. Rep. of Germany, assignors to Wintershall Aktiengesellschaft, Kassel, Fed. Rep. of Germany

Filed Jan. 20, 1987, Ser. No. 4,611

Claims priority, application Fed. Rep. of Germany, Jan. 20, 1986, 3601428

Int. Cl.[4] B09B *3/00, 1/00*

U.S. Cl. 405—128 **15 Claims**

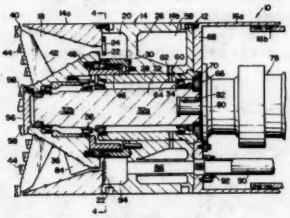
1. A process for the pretreatment of solid wastes, and wastes to be compacted, for introduction into underground salt cavities or salt caverns via a downpipe under the force of gravity, wherein solid, uncomminuted or comminuted wastes are mixed with waste sludges in a ratio of solid wastes to waste sludges of from 60:40 to 95:5, based on the sum of the substances as 100% by weight, and the water content of the dry wastes is adjusted by the addition of an aqueous salt solution to from 1 to 15% by weight, based on the total amount of dry wastes, and from the resulting material moldings are produced in the form of granules, agglomerates or pellets, and, if appropriate, the moldings are surface-dried or dried completely and are then allowed to flow into the salt cavity or salt cavern and form a pile therein until the said cavity or cavern is substantially full, and, if required, the salt cavity or salt cavern is closed.

4,886,394

SHIELD TUNNELING MACHINE

Toshio Akesaka, Yokohama, Japan, assignor to Kabushiki Kaisha Iseki Kaihatsu Koki, Tokyo, Japan

Filed Jul. 27, 1988, Ser. No. 225,084
Int. Cl.[4] F21D 9/00
U.S. Cl. 405—141 10 Claims



1. A shield tunneling machine comprising;
a shield body;
a rotor disposed in a front portion of the shield body;
support means provided behind said rotor in said shield body and for supporting said rotor so as to be eccentrically rotatable around the center axis of said shield body;
drive means for moving said rotor eccentrically; and
seal means disposed between said support means and said rotor;
wherein said seal means has an annual recess provided around said center axis in a position where one of said support means and rotor faces the other of said support means and said rotor and opened to the other of said support means and said rotor, a ring disposed in the recess so as to be movable in the direction of said center axis and having an approximately constant outer diameter and a spring for pressing the ring toward the other of said support means and said rotor;
the other of said support means and said rotor having an annular contact portion to contact with the whole end face of said ring; and
the diameter D_1 of said ring, the diameter D_2 of said contact portion, and the distance between the center of said ring and the center of said contact portion e having the following relationship:

$$D1 \leqq D2 - 2e.$$

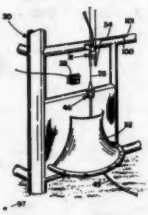
4,886,395

PIPELINE TO RISER CONNECTION METHOD AND APPARATUS

David A. Moles, Katy, and Charles R. Yemington, Houston, both of Tex., assignors to Standard Oil Company, Cleveland, Ohio

Filed Jul. 2, 1987, Ser. No. 69,547
Int. Cl.[4] E16L 1/04; E21B 43/01
U.S. Cl. 405—169 21 Claims

1. Apparatus for connecting an offshore structure to a pipeline lying on the sea floor, comprising:
a riser flowline carried by said offshore structure and extending downwardly from the surface along a portion of the submerged height of the offshore structure to a point above the sea floor;
a pipe end receiver attached to the lower end of said riser flowline;
a flexible pipe attached to the end of said pipeline;
a pipe end terminal attached to the free end of said flexible pipeline for connection to said receiver on said offshore structure;
a bending guide for said flexible pipe attached to the lower end of said offshore structure beneath said receiver and above the sea floor; and
means for pulling the free end of said flexible pipeline generally horizontally to said bending guide, then arcuately through said bending guide and then generally vertically upwardly from said bending guide to said receiver for connection of said terminal to said receiver.

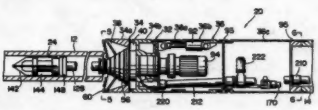


4,886,396

EXISTING PIPELINE RENEWING METHOD AND APPARATUS THEREFOR

Toshio Akesaka, Yokohama, Japan, assignor to Kabushiki Kaisha Iseki Kaihatsu Koki, Tokyo, Japan

Filed May 11, 1988, Ser. No. 193,110
Int. Cl.[4] E03F 3/06; F16L 1/02
U.S. Cl. 405—184 36 Claims



22. An apparatus for renewing an existing pipeline by laying a new pipe while breaking an existing pipe embedded in the ground so as to define the existing pipe, comprising:
a shield tunnelling machine for excavating at least said existing pipe; and seal means to be disposed in the existing pipe so as to close the existing pipe in front of said tunnelling machine so as to prevent sewage leakage from the existing pipe.

4,886,397

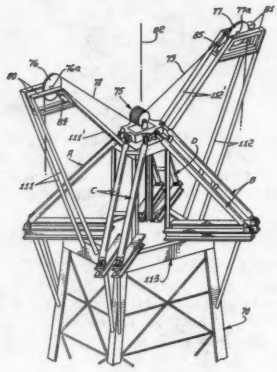
DYNAMIC LOAD COMPENSATING SYSTEM

T. Dave Cherbonnier, 57 Kheam Hock Road, Singapore 1129, Singapore

Filed Aug. 27, 1987, Ser. No. 90,130
The portion of the term of this patent subsequent to May 5, 2004, has been disclaimed.
Int. Cl.[4] E21B 7/12, 19/09
U.S. Cl. 405—195 20 Claims

1. In a dynamic load compensating system, for supporting a crown block, the combination comprising
(a) first structure including the crown block to receive applied loading, the subject to displacement generally in the direction of load exertion,
(b) a base frame spaced from said first structure, and
(c) means including groups of generally parallel fluid actuator members pivotally connected to said base frame and to said structure for supporting said structure on the base, said members acting to resist said displacement of said structure characterized in that said base may move relatively toward and away from said structure while said loading continues to be applied to said structure, the actuators in each group extending in parallel relation, the actuator members of each group being interconnected

along their lengths between their pivotal connections to the base frame and said first structure, so as to extend in and remain in side-by-side relation during actuation, the actuators of each pair including pistons and cylinders, the cylinders being directly interconnected proximate the ends of the cylinders from which the pistons emerge, there being two groups of said actuator members, respectively at opposite sides of the path of said structure displacement, the actuators of each pair having like inclinations to said



path, and from vertical, and there being side load resisting clevis devices pivotally connecting each of the actuators at its opposite ends respectively to said base frame and to said first structure.

(d) and including a sheave offset from the crown block and guidedly engageable with a line that extends from the crown block, a first link connected to the sheave to pivot about a first axis defined by the sheave and also connected to the crown block to pivot about a second axis adjacent the crown block, said first and second axes being parallel.

4,886,398

SEA PLATFORMS FOR IMPROVING THEIR DYNAMIC BALANCE

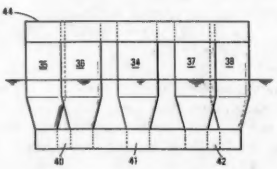
Charles Sparks, Le Vesinet, France, assignor to Alsthom Atlantique Institut Francais du Petrole, Rueil Malmaison, France

Filed Oct. 13, 1988, Ser. No. 257,168

Claims priority, application France, Aug. 26, 1983, EN83/13.864

Int. Cl.[4] B63B *35/44*

U.S. Cl. 405—224 **16 Claims**



1. A sea platform which comprises several vertical columns, at least partially submerged in service and some of which are joined together at their lower ends by pontoon means and which support a deck at their upper portions, over at least one submerged portion of at least one vertical column the section defined by the intersection of this portion with a horizontal plane decreases when the depth increases to provide sloping walls on said one submerged portion; dynamic pressure forces acting on said sloping walls generating upwardly directed resultant forces so that fluctuations of forces and moments acting on the platform are reduced; the lower ends of said vertical columns having smaller cross-sections than the upper portions of said columns.

4,886,399

METHOD OF CONSTRUCTING A FOUNDATION FOR BUILDINGS

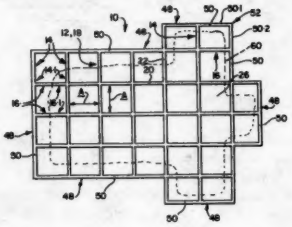
John T. Pidgeon, 417 Milner St., Waterkloof, Pretoria, Transvaal Province, South Africa

Filed Feb. 10, 1988, Ser. No. 154,846

Claims priority, application South Africa, Feb. 12, 1987, 87/1045

Int. Cl.[4] E02D *27/00*

U.S. Cl. 405—229 **14 Claims**



1. In a method of constructing a stiffened raft foundation for a building which includes

forming in the ground a grid of intersecting foundation trenches, the grid being made up of two sets of substantially parallel trenches, each trench of each set intersecting at least one trench of the other set;

continuously casting settable material within the trenches to obtain an integral grid of intersecting foundation beams; and

continuously casting a covering of settable material over the beams and integral therewith, to obtain a slab covering the ground between the beams and having a flat upper surface, the improvement of forming the trenches such that the spacing between adjacent parallel beams of the grid is 1 to 2 meters, and the width of each foundation beam is 100 to 170 mm.

4,886,400

SIDE CUTTING BLADES FOR MULTI-SHAFT AUGER SYSTEM AND IMPROVED SOIL MIXING WALL FORMATION PROCESS

Osamu Taki, Belmont, and Shigeru Takeshima, San Mateo, both of Calif., assignors to S.M.W. Seiko, Inc., Redwood City, Calif.

Filed Mar. 23, 1988, Ser. No. 172,401

Int. Cl.[4] E02D *3/12, 5/18*

U.S. Cl. 405—267 **46 Claims**

1. A multi-shaft auger apparatus for mixing soil with a chemical hardener in situ to form a hardened soilcrete column, the apparatus comprising:

at least two substantially parallel shafts;

means for rotating the shafts;

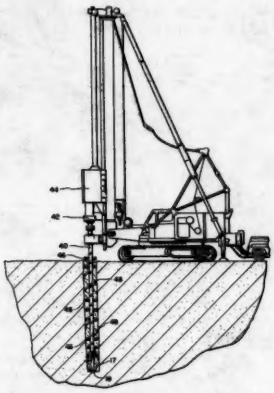
means securely affixed to each of the shafts for boring downwardly through the soil;

means for injecting the chemical hardener into the soil through which the shafts bore;

means securely affixed to each shaft for mixing the chemical hardener with the soil surrounding the shaft;

support means located about each respective shaft such that said support means does not rotate as the respective shaft rotates in the soil; and

a pair of substantially parallel cutting blades, each of said cutting blades being attached to the support means located on each of the shafts, said cutting blades presenting a cutting edge to the soil as the shafts move downwardly



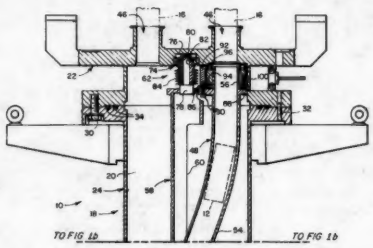
through the soil, said pair of cutting blades causing the soil between the pair of cutting blades to mix with the chemical hardener as the shafts progress downwardly through the soil, thereby forming a soilcrete column.

4,886,401

DIVERTER ASSEMBLY FOR RADIOACTIVE MATERIAL

Katherine M. Andrews, Pittsburgh, and Robert W. Starenchak, Youngwood, both of Pa., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Apr. 11, 1988, Ser. No. 179,922
Int. Cl.[4] B65G 51/24
U.S. Cl. 406—182 6 Claims



1. A diverter assembly for diverting a pneumatically conveyed holder for radioactive material between a central conveying tube and one of a plurality of conveying tubes radially offset from the central conveying tube comprising:

an airtight container having a hollow interior, a first aperture about which the central tube is connected, and a respective plurality of second apertures about which respective offset tubes are connected;

a diverter tube in said container having a first end located immediately adjacent said first aperture and a second end offset from said first end a distance equal to the radial offset of the conveying tubes from the central tube, said diverter tube having a sinuous central portion connecting said first and second ends such that the holder is easily conveyed through said diverter tube;

a first mounting means in said container for mounting said diverter tube for rotation about a longitudinal axis of said first end such that said second end is selectively brought into alignment with respective said second apertures;

a rotary seal means for sealing said first end of said diverter tube from the interior of said container during and after rotation of said diverter tube;

a spring biased seal means for sealing said second end of said diverter tube from the interior of said container during and after rotation of said diverter tube to a selected second aperture;

an indexing means for rotatably indexing said second end of said diverter tube to a selected one of said second apertures of said container, said indexing means being located in said container; and

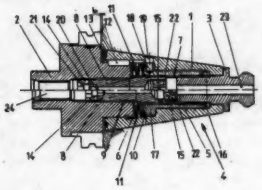
a drive means for selectively driving said indexing means, said drive means including a motor mounted to an outside of said container adjacent a passage in said container, a drive shaft for said motor passing through said passage, and a passage seal means in said passage for sealing the inside of said container.

4,886,402

DEVICE FOR MOUNTING OF TOOLHOLDERS

Emile Pfalzgraf, Bouxwiller, France, assignor to Emile Pfalzgraf "EPB", S.A., Bouxwiller, France

Filed Jul. 25, 1988, Ser. No. 223,967
Claims priority, application European Pat. Off., May 6, 1988, 88440036.7
Int. Cl.[4] B23C 5/26; B21B 31/04
U.S. Cl. 409—234 8 Claims



1. Device for mounting of attachments, toolholders and tools with cone and face application, especially for machining and turning centers with automatic or manual changers of tools with tapered shank, in particular with 7/24th taper, comprising a cone (1) for introduction in the spindle, a front part (2) centered in an aperture in said cone (1) and provided with a flange for application against the face of the spindle and a gripping knob (3) for assembly of cone (1) and front part (2), in which said gripping knob is connected to an intermediate non-deformable connecting device having means to allow adjustment of the length thereof, said connecting device being connected to said front part thereby to secure said front part to said cone.

4,886,403

TIE DOWN APPARATUS FOR WHEELCHAIR

Gerald L. Gresham, 30800 Wixom Rd., Wixom, Mich. 48096

Filed Mar. 9, 1988, Ser. No. 165,916
Int. Cl.[4] B60P 3/06
U.S. Cl. 410—10 23 Claims

20. An apparatus for securing a wheelchair to the floor of a vehicle wherein the wheelchair has a front and a rear and includes a frame means with front posts mounting spaced apart front wheels on front axle means and rear axle means mounted

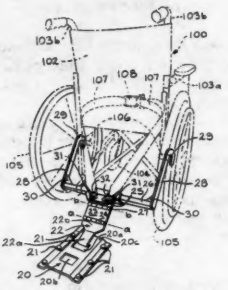
on the frame means supporting spaced apart rear wheels behind the front wheels which comprises:

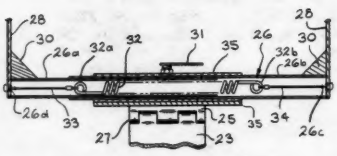
(a) a front attachment means for securing the front of the wheelchair to the floor; and

(b) a rear attachment means for securing the rear wheelchair to the floor including

(i) a rear bar means which can mount on the rear of the frame means;

(ii) a connection link means having opposed ends with a rear hook means secured at one of the ends and attached





to the rear bar means at the other end and with a hinge means intermediate the ends of the link means which folds on a horizontal axis; and

(iii) a rear plate means with an opening for engaging the rear hook means, wherein the hook means, link means and rear bar means hold the wheelchair in position when the wheelchair is pulled in the forward direction by the front attachment means, wherein a spring means is provided in the rear bar means which telescopes the rear bar means together so that the arm means tend to be compressed together.

4,886,404

SUPPORT ASSEMBLY WITH RETAINER

Finn Jensen, Dolton, and Rudolph E. Nadherny, Naperville, both of Ill., assignors to Ireco, Inc., Chicago, Ill.

Continuation of Ser. No. 181,748, Apr. 14, 1988, Pat. No. 4,842,459. This application Apr. 20, 1989, Ser. No. 341,359

Int. Cl.[4] B60R *7/00*

U.S. Cl. 410—97 **5 Claims**

1. A support assembly, comprising:

a plurality of elongated cables;

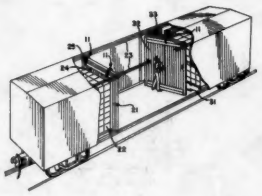
a plurality of securement members spaced along and rigidly attached to said cables;

a stiff, elongated eye formed from the combination of said cables and said spaced apart securement members;

said cables being sufficiently resilient such that said elongated eye will expand and move back in a direction generally transverse to the length of the support assembly, said cables of the elongated eye being biased toward a generally closed orientation to provide wedging means for receiving an end of the support assembly;

said end including rigid one-way means securely attached onto a length of at least one of said cables for controlling passage of said end and one-way means through said elongated eye;

said one-way means having a passage orientation with respect to said cable length for allowing passage thereof through said elongated eye, and said one-way means having a preventing orientation with respect to said cable length for preventing passage thereof and of said end through said elongated eye; and



wherein a leading edge of said one-way means wedgingly engages said elongated eye when said one-way means is in its passage orientation in order to thereby facilitate opening of said elongated eye to permit passage of the one-way means therethrough, and wherein a retaining edge of said one-way means retainingly engages a surface of said elongated eye when said one-way means is in its preventing orientation.

4,886,405

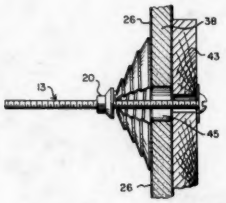
WALL MOUNTING DEVICE

Ingvar M. Blomberg, 10025 E. Girard, #131-E, Denver, Colo. 80231

Filed Jan. 27, 1989, Ser. No. 302,670

Int. Cl.[4] F16B *13/04, 21/00*

U.S. Cl. 411—16 **6 Claims**



1. Device for mounting an article to a wall board, through a hole in said wall board, comprising:

(a) threaded bolt;

(b) anchor portion comprising a ribbon-like strip of resilient material having a generally flat rectangular cross-sectional configuration and spirally wound in a plurality of turns so as to be resiliently held in a conical configuration wherein edge portion of adjoining turns of said strip lie closely in overlapping relationship, and wherein the outermost turn of said spirally wound strip presents a generally circular portion for engaging a planar surface and exerting a force thereon, and said anchor having a threaded bore portion for receiving said bolt and affixed to a first end of said spirally wound strip and with the bore of said threaded bore portion aligned with the central axis of said conical configuration, said strip being resiliently uncoilable in one axial direction when its turns are urged apart in one direction, and maintaining its conical configuration by virtue of said overlapping edge portions making mutual frictional binding engagement when said generally

circular portion is urged against a planar surface, and wherein said strip has a first major surface and a second major surface, and a first ridge extending along the inner edge of said first major surface and projecting therefrom in a first direction and a second ridge extending along the outer edge of said second major surface and projecting in a direction which is opposite said first direction, wherein said first ridge is engagable with said second major surface and said second ridge is engagable with said first major surface.

4,886,406

ANCHOR BOLT AND EXPANSION WEDGE

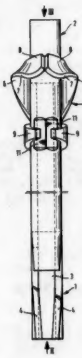
Armin Herb, Peissenberg, Fed. Rep. of Germany, assignor to Hilti Aktiengesellschaft, Fürstentum, Liechtenstein

Filed Apr. 27, 1988, Ser. No. 186,899

Claims priority, application Fed. Rep. of Germany, Apr. 27, 1987, 3714008

Int. Cl.[4] F16B *13/04*

U.S. Cl. 411—78 14 Claims



1. Anchor member assembly comprising an axially elongated anchor bolt and an axially elongated expansion wedge, each of said anchor bolt and expansion wedge has a leading end and a trailing end relative to the insertion direction of the assembly into a borehole in a receiving material, said anchor assembly having an insertion condition and an expansion condition, said anchor bolt and expansion wedge being in detachable engagement in the insertion condition and the detachable engagement being released and said anchor bolt and expansion wedge being in relative axial displacement in the expansion condition, said anchor bolt has an axially extending head section at the trailing end thereof and an axially extending first wedge surface at the leading end thereof with an axially extending first shank section located therebetween, in the insertion condition said first shank section having an axially extending surface facing and in contact with said expansion wedge, said first wedge surface sloping angularly outwardly from said surface of said first shank section, said expansion wedge has an axially extending second shank section extending from the trailing end thereof toward the leading end in contact with the surface of said first shank section, and an axially extending second wedge surface adjacent the leading end thereof and extending axially from said second shank section, said second wedge surface arranged to contact and to be axially displaced relative to said first shank surface as said anchor member assembly is moved into the expansion condition after releasing the detachable engagement of said anchor bolt and expansion wedge in the insertion condition, in the insertion condition the trailing end of said expansion wedge projects axially outwardly from the trailing end of said anchor bolt, wherein the improvement comprises that said first shank section has a circumferentially extending outer peripheral edge at the trailing end thereof, said head section widens outwardly in the axial direction along a circumferential part of said outer peripheral edge of said first shank section toward the trailing end of said anchor bolt with said head section forming a part of a conically-shaped surface, said head section has at least one support shoulder located at the trailing end of said head section and spaced radially outwardly from the outer peripheral edge of said first shank section, and a flange section extends from a part of said head section extending from said outer peripheral edge and into said support shoulder, said head section comprises a pair of ribs spaced apart in the circumferential direction and extending from said outer peripheral edge and toward said at least one support shoulder, said ribs forming a part of the conically-shaped surface.

4,886,407

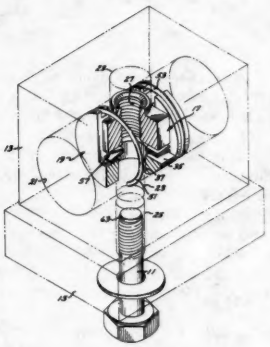
ALIGNMENT AND RETENTION MECHANISM FOR BARREL NUT FASTENER APPARATUS

Thomas E. Harbin, Westminster, Calif., assignor to Rexnord Holdings Inc., Calif.

Filed Oct. 12, 1988, Ser. No. 256,687

Int. Cl.[4] F16B *37/00*

U.S. Cl. 411—104 4 Claims



1. A barrel nut fastener apparatus adapted to be positioned within a cylindrical bore in a panel and to threadedly receive a bolt extending through a bolt hole in the panel, the bolt hole being oriented transversely to the cylindrical bore and extending on opposite sides of the bore, the apparatus comprising:

a nut having a threaded bore with a longitudinal axis and further having a cylindrical projection coaxial with the threaded bore; and

retainer means adapted to be positioned within the cylindrical bore in the panel for supporting the nut in a position to threadedly receive the bolt extending through the bolt hole in the panel oriented transversely to the cylindrical bore and extending on opposite sides of the bore, the retainer means including

a partial cylindrical body size to be slidable into the cylindrical bore,

means defining a seat for conformably receiving the nut in a prescribed position, with the cylindrical projection facing away from the seat, while permitting limited movement of the nut along transverse axes perpendicular to the nut's longitudinal axis,

means for yieldably biasing the nut away from the seat, such that the cylindrical projection projects into the bolt hole of the panel and thereby releasably secures the apparatus in a prescribed position in the cylindrical bore of the panel, and

means defining a bore extending through the partial cylindrical body and emerging in the center porition of the seat, the bore oriented substantially perpendicular to the seat

and configured to guide the bolt into threaded engagement with the nut.

4,886,408

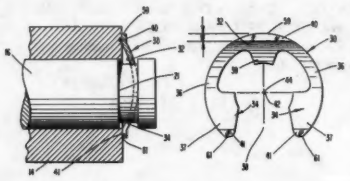
BOWED EXTERNAL SPRING RETAINING RING OF THE E-SHAPED TYPE

Edmund F. Killian, Merrick, and Wallace H. Berliner, Woodside, both of N.Y., assignors to Waldes Truarc, Inc., Long Island City, N.Y.

Continuation of Ser. No. 888,468, Jul. 23, 1986, Pat. No. 4,798,075, which is a division of Ser. No. 650,662, Sep. 14, 1984, abandoned. This application Sep. 1, 1988, Ser. No. 239,467

Int. Cl.[4] F16B *2/24, 21/10*

U.S. Cl. 411—519 **1 Claim**



1. A bowed external spring retaining ring of the E-shape type of generally U-shaped cross-section and symmetrically bowed about a line transverse to its longitudinal axis; comprising:

a spring steel ring having a discontinuous circumference thereby forming an open ended ring including:

a middle section (32),

a pair of end sections (34),

a pair of intermediate sections (36) interconnecting said middle and end sections; and

the end sections (34) each including lugs (37) spaced apart to define an opening (38) located opposite the middle section (32), and

a middle prong (39) projecting generally radially inwardly from said middle section (32), with said middle prong (39) and middle section (32) having a combined radial width, said intermediate sections (36) having radial widths each less than the radial width of the lugs (37) and less than the combined radial width of the middle prong (39) and the middle section (32),

flats (40, 41) formed in the middle section (32) and the end sections (34) to define the trailing and leading ends of the ring, the flats (40, 41) being mutually coplanar, said flat (40) adjacent said prong (39) terminating short of said prong and being of a radial width less than the combined radial width of the middle section (32) and prong (39)

said intermediate sections, said prong and a part of said lugs being bowed about an imaginary transverse line to define concave and convex sides of said ring, said transverse line extending transverse to the longitudinal axis of said ring,

said end sections having rounded leading edges on said concave side of said ring.

4,886,409

BIG BALE UNROLLER

Jacob Penner, Winnipeg, Canada, assignor to Inland Steel & Forgings Ltd., Winnipeg, Canada

Filed Dec. 14, 1988, Ser. No. 284,178

Claims priority, application Canada, Feb. 10, 1988, 558622

Int. Cl.[4] A01D *87/12*

U.S. Cl. 414—24.6 **14 Claims**

14. A round bale transporter and unroller comprising:

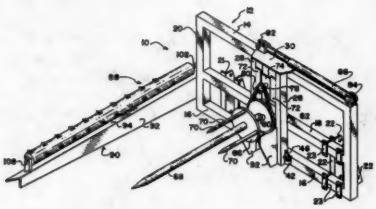
a frame;

means for mounting the frame on a front end loader so as to extend laterally across the front of the loader;

a carriage mounted on the frame for lateral movement thereon;

a bale support means mounted on the carriage and comprising bale impaling spikes mounted on a base and projecting forwardly from the carriage, and means mounting the base on the carriage for rotation about a longitudinal axis;

bale unrolling means mounted on the frame to one side of the bale support means, including a cylinder with a plurality of teeth thereon mounted for rotation about an axis substantially parallel to the longitudinal axis, and a guide plate positioned below the cylinder:



first drive means for rotating the bale support means around said longitudinal axis;

second drive means for rotating the bale un roller cylinder in the same direction as the rotation of the bale support means; and

bale shifting means joining the frame and carriage for moving the carriage laterally towards the unrolling means.

4,886,410

APPARATUS FOR THE MANIPULATION OF SPACER FRAMES

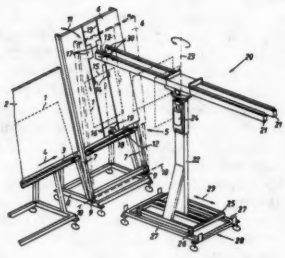
Peter Lisec, Bahnhofstrasse 34, A-3363 Amstetten-Hausmening, Austria

Filed Jun. 6, 1988, Ser. No. 203,070

Claims priority, application Austria, Jun. 9, 1987, 1451/87

Int. Cl.[4] B65G *61/00*

U.S. Cl. 414—27 **12 Claims**



1. Apparatus for the manipulation of hollow spacer frames for insulating glass, which are conveyed in an essentially vertical upright position to a receiving station, with a plurality of lifting elements displaceable in an upward direction in the area of the receiving station in slots in a substantially vertical lateral supporting wall, against which the spacer frames are abutting, said lifting elements contacting an inner portion of the frame, characterized in that opposite to the receiving stations (5) a carrier (20) with at least two essentially horizontal parallel beams (21) is provided, and that said lateral supporting wall (6) is tilted (11) toward the carrier (20) around a lower horizontal axis (10) aligned parallel to the conveying direction (4) to transfer a spacer frame (1) raised by the lifting elements (14)

from along the lateral supporting wall (6), to the beams (21), said beams engaging said inner portion of the frames.

4,886,411

PROTECTIVE MEANS FOR A LIFTING/TILTING OR TILTING DEVICE

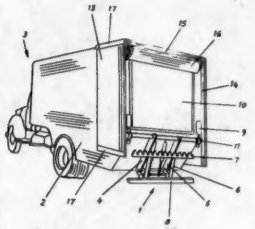
Hans J. Pieperhoff, Zornheim, and Karl-Heinz Droge, Löhne, both of Fed. Rep. of Germany, assignors to Zoller-Kipper GmbH, Mainz-Laubenheim, Fed. Rep. of Germany

Filed Feb. 2, 1988, Ser. No. 151,469

Claims priority, application Fed. Rep. of Germany, Feb. 7, 1987, 3703795

Int. Cl.[4] B60P *1/28*

U.S. Cl. 414—408 18 Claims



1. A protective means for lifting/tilting or tilting device of the type adapted to empty containers into a pour-in opening of a collection container, in particular of a garbage collection vehicle, characterized in that the pour-in opening (10) of the collection container (2) is equipped with a shield (12) which envelops the working area of the lifting/tilting or tilting device (1) in the manner of a hood, in that the collection container (2) has guide rails (17) and said shield (12) has wall parts (13, 14, 15, 16) which are movably connected to the collection container (2) by said guide rails (17), in that the shield (12) contains at least one electrical control circuit for the lifting/tilting or tilting device, and in that an electric switch (18) is provided, disposed in said electrical control circuit having its "on" position corresponding only to the closed operating position of the shield (12), said switch being mounted on and responsive to the movement of at least one of the wall parts (13, 14, 15, 16).

4,886,412

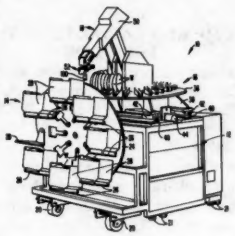
METHOD AND SYSTEM FOR LOADING WAFERS

Michael J. Wooding, Sunnyvale; Rudolfo S. Cardema, San Jose, and Charles L. Ramiller, Santa Clara, all of Calif., assignors to Tetron, Inc., Fremont, Calif.

Filed Oct. 28, 1986, Ser. No. 924,075

Int. Cl.[4] B65G *47/91*

U.S. Cl. 414—416 11 Claims



1. A system for transferring semiconductor wafers between a processing vessel and wafer cassettes, said system comprising:

a frame capable of being positioned proximate the processing vessel;

means mounted on the frame for transporting a plurality of wafer cassettes along a closed path;

a support surface rotatably mounted on the frame;

means on the support surface for holding a plurality of individual wafers in a generally vertical orientation;

means mounted on the frame for rotating the support surface;

a robotic arm assembly having a base positioned at the center of the rotatably mounted support surface and a manipulable arm which extends from the base and which can be selectively positioned relative to the frame;

means mounted on the arm for detachably securing individual wafers; and

means for manipulating the arm.

4,886,413

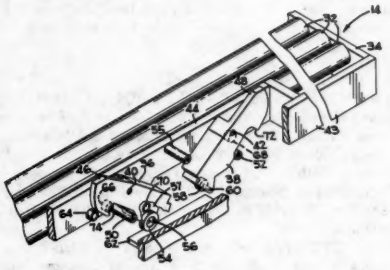
LOADER PLATFORM INTERFACE CONTROL AND STOP MEANS

Michael A. Leon, Orlando, Fla., assignor to FMC Corporation, Chicago, Ill.

Filed Apr. 29, 1988, Ser. No. 188,259

Int. Cl.[4] B65G *67/02*

U.S. Cl. 414—495 7 Claims



1. A stop means for the front platform of an aircraft cargo loader, said loader including an elevatable rear platform comprising:

a first pivot arm pivotally attached to said front platform;

a stop member formed on one end of said pivot arm;

said pivot arm and stop member having a center of gravity relative to said pivotal attachment to cause said stop member to normally project above said front platform; and

a roller flag carried by said pivot arm and mounted to permit linear vertical movement of said flag relative to said pivot arm, whereby movement of said roller flag indicates the vertical relationship between said platforms.

4,886,414

TRAVERSING METHOD FOR LONG AND HEAVY ARTICLE

Yoshitada Fujita, Kobe, and Sadashi Hanada, Miki, both of Japan, assignors to Kawasaki Jukogyo Kabushiki Kaisha, Japan

Division of Ser. No. 807,692, Dec. 11, 1985, Pat. No. 4,721,429. This application Oct. 19, 1987, Ser. No. 109,531

Claims priority, application Japan, Dec. 24, 1984, 59-272557

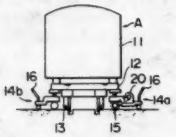
Int. Cl.[4] B60P *3/40*

U.S. Cl. 414—786 8 Claims

1. A method of transporting a long and heavy article on a substantially flat surface in a direction which is transverse with respect to a longitudinal axis of the article from a first location

to a desired location, the article having two lengthwise ends and two widthwise sides, the method comprising the steps of:

disposing a first pair of wheel tracks at one of the lengthwise ends of the article and a second pair of wheeled trucks at the other lengthwise end of the article, the two trucks of each pair being located on opposite widthwise sides of the article from one another, at least one truck of each pair being self-propelled, each of the trucks being independently movable and steerable and being connected to the others solely by the article;



steering the trucks in the direction in which the article is to be transported;

lifting the article by lifting means carried on the trucks to a level high enough to permit the article to clear any obstacle between the first location and the desired location during transport;

operating the self-propelled trucks to propel the trucks and transport the article transversely to the desired location;

lowering the article at the desired location by said lifting means; and removing said trucks from the article.

4,886,415

FAN WITH AN ESSENTIALLY SQUARE HOUSING

Raimund Engelberger; Siegfried Harmsen, both of St. Georgen; Hilmar Kirchgessner, Villingen, and Josef Schneider, St. Georgen, all of Fed. Rep. of Germany, assignors to Papst-Motoren GmbH, St. Georgen, Fed. Rep. of Germany

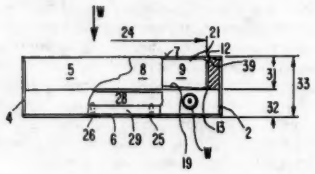
PCT No. PCT/EP86/00680, § 371 Date Sep. 25, 1987, § 102(e) Date Sep. 25, 1987, PCT Pub. No. WO87/03343, PCT Pub. Date Jun. 4, 1987

PCT Filed Nov. 26, 1986, Ser. No. 83,792

Claims priority, application Fed. Rep. of Germany, Nov. 26, 1985, 3541787

Int. Cl.[4] F04D *29/66*

U.S. Cl. 415—119 **18 Claims**



1. A fan assembly having a rectangular parallelepiped housing and an impeller means having blade means and said impeller means being centrally driven by an electric motor; wherein an axis of rotation of the impeller means is perpendicular to a first main inlet surface of the housing and parallel to a flow through the fan; the flow through the fan being deflected by 90° and leaving the housing through at least one lateral surface of the housing that is perpendicular to said first main inlet surface; a second main closed wall surface in said housing that is opposite the first main inlet surface; outlet blade edges on the blade means are spaced downstream in a flow direction from the air inlet surface and spaced from the second main closed wall surface; the impeller means producing an axial flow through the blade means and having an air-guiding duct, that is formed by a wall means that radially and completely surrounds the blades means to cause flow through the fan to exit the outlet blade edges only in an axial direction.

4,886,416

EXHAUST-GAS TURBOCHARGER FOR AN INTERNAL-COMBUSTION ENGINE

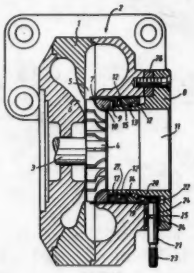
Klaus Wunderlich, Waiblingen, Fed. Rep. of Germany, assignor to Daimler-Benz Aktiengesellschaft, Stuttgart, Fed. Rep. of Germany

Filed Oct. 11, 1988, Ser. No. 256,325

Claims priority, application Fed. Rep. of Germany, Oct. 10, 1987, 3734386

Int. Cl.[4] F01D *17/14*

U.S. Cl. 415—158 **14 Claims**



1. Adjusting device for the throughput of exhaust gas through the turbine of an exhaust-gas turbocharger for an internal-combustion engine, the turbine having a double flow housing with two channels for supplying the exhaust gases to the turbine wheel, of which one channel can be closed off as a function of a variable operating parameter by means of a sliding sleeve which is mounted in the housing so as to be axially displaceable in the manner of a positive sliding fit by means of slot like longitudinal grooves in said sliding sleeve.

wherein the sliding sleeve is connected to an axially fixed and circumferentially rotatable driving ring via driving pins which engage into the longitudinal grooves arranged in the sliding sleeve and which drive these in the circumferential direction,

wherein a slot pin fixed to the housing engages into a helical groove in the sliding sleeve, and

wherein a shaft engages on the driving ring via a positive connection and is guided radially out of the housing via a bearing in the latter.

4,886,417

FUEL PUMP AND RADIAL-FLOW IMPELLER THEREFOR

Steven C. Remstad, Rockford, and John M. Kassel, Roscoe, both of Ill., assignors to Sundstrand Corporation, Rockford, Ill.

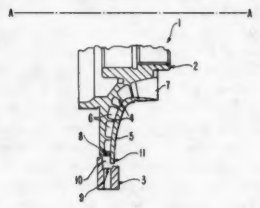
Filed Dec. 6, 1988, Ser. No. 280,715

Int. Cl.[4] F04D *29/24*

U.S. Cl. 415—208.3 **11 Claims**

1. A fuel pump comprising a radial-flow impeller having a front shroud and discharge means for discharging fuel from the impeller, a diffuser ring with a throat entrance located opposite and in spaced relation to the discharge means of the impeller, and wherein the front shroud of the impeller has an extension which extends into the space between the impeller discharge means and the throat entrance of the diffuser ring and wherein a surface of the extension which is adjacent the liquid dis-

charged from the impeller discharge means tapers away from the path of the liquid at an angle of between 4 degrees and 10



degrees to diffuse a pressure rise of the liquid being discharged from the impeller discharge means.

4,886,418

BLOWER FOR DELIVERING COOLING AIR TO INTERNAL COMBUSTION ENGINES

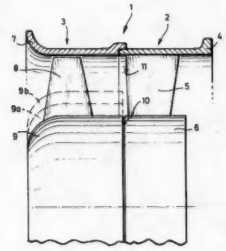
Leo Lichtblau, Cologne, Fed. Rep. of Germany, assignor to Kloeckner-Humboldt-Deutz AG, Fed. Rep. of Germany

Filed Dec. 5, 1988, Ser. No. 279,661

Claims priority, application Fed. Rep. of Germany, Dec. 17, 1987, 3742841

Int. Cl.[4] F04D *29/60*

U.S. Cl. 415—912 **9 Claims**



1. A single stage axial flow blower of the type having a series of interchangeable rotary bladed impellers and an axially adjacent stationary guide vane wheel, said blower delivering cooling air to a piston-type air-cooled internal combustion engine with any one of a series of 2 to 4 numbers of cylinders wherein the dimensioning of the impeller is varied to attain a rate of cooling air flow for the engine with which used while retaining the same air delivery pressure and blower speed, a stationary ring (7) surrounding said impeller, said guide vane wheel including a guide wheel hub, guide vanes extending radially outward from said hub and a radially outer ring surrounding said guide vanes and extending axially in end-to-end relation to said stationary ring, the inner diameters of said rings being substantially equal, one of said series of said impellers including a hub (9) having an outer diameter substantially equal to the outer diameter of said wheel hub (6) when said blower is installed in said engine with four cylinders and the other of said series of said impellers having a larger outer diameter hub than said diameter of said wheel hub when said blower is installed on an engine having less than four cylinders.

4,886,419

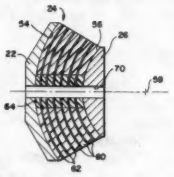
ELASTOMERIC BEARING FOR HELICOPTER ROTOR HAVING LEAD-LAG DAMPING

Hugh A. McCafferty, Upper Darby, Pa., assignor to The Boeing Company, Seattle, Wash.

Filed Sep. 30, 1988, Ser. No. 252,795

Int. Cl.[4] B64C *27/38*

U.S. Cl. 416—134 A **13 Claims**



1. In a helicopter rotor having a rotor hub adapted for driveable connection to a power source and rotor blades extending radially along an axis directed outward from the hub, a joint between a rotor blade and hub comprising:

a first bearing race fixed to the blade having a surface facing the blade and centered substantially on the axis;

a second bearing race fixed to the hub, having a surface facing the surface of the first bearing race and spaced radially outward along the axis from the first bearing race;

shims of relatively rigid material spaced from one another along the axis and located between the first and second bearing races;

laminates of material from the group consisting of natural and synthetic elastomer, silicon elastomer and visco-elastic material, interposed between each shim and the first and second bearing races, bonded to said shims and races, each laminate having an opening through its thickness;

coupons of material having relatively higher damping characteristics than that of the laminates and shims, located in the openings of the laminates, substantially filling each opening, and bonded to adjacent shims and races.

4,886,420

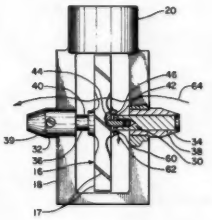
PROTECTED FLOW METER ROTOR BEARING

John B. Catch, Longmont, Colo., assignor to Engineering Measurments Company, Longmont, Colo.

Filed Jun. 10, 1988, Ser. No. 204,879

Int. Cl.[4] F03B *11/06*

U.S. Cl. 416—174 **8 Claims**



1. In flow meter turbine rotor apparatus having a rotor with a hub journaled in a frame and a plurality of vanes extending radially outward from the hub for insertion in a stream of flowing fluid, the improvement comprising:

an elongated bearing rod having a proximal end attached to said rotor and a cylindrical peripheral surface extending to said distal end, said rotor having an annular shoulder protruding axially outward from said hub in a manner that

defines a cavity in the side of said rotor into which said distal end of said bearing rod protrudes such that said annular shoulder is surrounding, but not contacting, a portion of the peripheral surface of said bearing rod that is adjacent said distal end, said annular shoulder having a flat outer surface that extends radially outward from said portion of said peripheral surface that is adjacent said distal end of said bearing rod, and said bearing rod having an axial bearing bore extending into its distal end; and

an axle protruding axially outward from said hub into said bearing bore, said axle being rotatably retained in said bearing bore.

4,886,421

WIND TURBINE AIR FOIL

David P. Danson, Phoenix, Ariz., assignor to Wind Feather, United Science Asc., Phoenix, Ariz.

Division of Ser. No. 569,567, Jan. 9, 1984, Pat. No. 4,764,090. This application Jan. 4, 1988, Ser. No. 140,731

Int. Cl.[4] F03D *7/06*

U.S. Cl. 416—236 R **3 Claims**

1. A blade for use in a wind driven turbine of the vertical axis type, comprising a blade body of elongated rectangular configuration having opposite blade surfaces and a leading edge and a trailing edge an therebetween generally parallel to each other wherein each blade is substantially straight and includes opposite longitudinally extending surfaces exposed to the wind with each surface having a series of troughs formed equispaced and parallel to each other along substantially the entire blade length with wind striking the blade surfaces deverges and decelerates as it flows through each trough towards the trailing edge thereby to effect transferring wind energy to the blades.

4,886,422

CONTROL APPARATUS OF VARIABLE DELIVERY PUMP

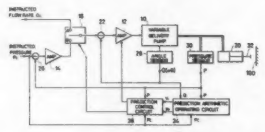
Kunihiko Takeuchi, Kawasaki; Yoshisuke Akita, Hasuda, and Osamu Hayakawa, Fuchu, all of Japan, assignors to Tokyo Keiki Company Ltd., Tokyo, Japan

Filed Jul. 7, 1988, Ser. No. 216,417

Claims priority, application Japan, Jul. 9, 1987, 62-171822; Jul. 28, 1987, 62-188546; Jul. 28, 1987, 62-188547

Int. Cl.[4] F04B *49/00*

U.S. Cl. 417—20 **4 Claims**



1. A control apparatus of a variable delivery pump comprising:

flow rate detecting means for detecting a delivery flow rate of said variable delivery pump;

pressure detecting means for detecting a delivery pressure of said pump;

flow rate control means for controlling a delivery amount of the pump so as to keep a designated flow rate value which is indicated by a flow rate setting device until a control load stops;

pressure control means for controlling the delivery amount of the pump such that the delivery pressure which increases when the control load stops is held to a designated pressure value which is indicated by a pressure setting device;

first prediction arithmetic operating means for predicting and calculating every predetermined period a remaining delivery volume which will be necessary until the delivery pressure at the present time reaches said designated pressure value on the basis of an increasing speed of the delivery pressure when the control load stops;

second prediction arithmetic operating means for predicting and calculating every predetermined period an excess delivery volume which will be discharged due to an operation time lag of the pump when it is assumed that the delivery of a fluid from the pump is stopped at the present time from the increasing speed of the delivery pressure when the control load stops; and

prediction control means for indicating the delivery stop of the pump or the control to a fixed delivery amount based on a stop leakage flow rate to said flow rate control means when the remaining delivery volume and excess delivery volume which are obtained from said first and second prediction arithmetic operating means coincide.

4,886,423

VARIABLE DISPLACEMENT SWASH-PLATE TYPE COMPRESSOR

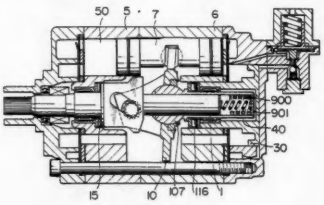
Shigeki Iwanami, Nishio; Mitsuo Inagaki; Hideaki Sasaya, both of Okazaki; Taro Tanaka, Nagoya, and Akikazu Kojima, Gamagori, all of Japan, assignors to Nippon Soken, Inc., Nishio, Japan

Continuation-in-part of Ser. No. 91,982, Sep. 1, 1987, abandoned. This application Jan. 20, 1988, Ser. No. 147,036

Claims priority, application Japan, Sep. 2, 1986, 61-206229; Dec. 18, 1986, 61-302296; Jun. 19, 1987, 62-154139; Sep. 1, 1987, 62-218548

Int. Cl.[4] F04B *1/26*

U.S. Cl. 417—222 **34 Claims**



1. A variable displacement swash-plate type compressor comprising:

a cylinder block having a plurality of cylinder bores therein;

a shaft rotatably supported in said cylinder block;

a swash plate tiltably connected to said shaft and adapted to be rotated together with said shaft;

pistons slidably received in said cylinder bores and adapted to be reciprocally moved in said cylinder bores in accordance with an oscillatory motion of said swash plate;

working chambers formed between both ends of each of said pistons and adjacent surfaces of an associated cylinder bore;

a support portion disposed coaxially with said shaft and supporting a central portion of said swash plate rotatably and tiltably; and

a spool for driving said support portion axially of said shaft, to move said central portion of said swash plate axially of said shaft to change the angle of tilt of said swash plate, whereby the strokes of reciprocatory movements of said pistons in said cylinder bores are changed, the arrangement being such that each piston can have strokes to a first

position in one of the working chambers associated with the piston and to a second position in the other working chamber, the piston stroke to said first position being different from the piston stroke to said second position.

4,886,424

MULTI-PISTON SWASH PLATE TYPE COMPRESSOR WITH DAMPING ARRANGEMENT FOR DISCHARGE REED VALVES

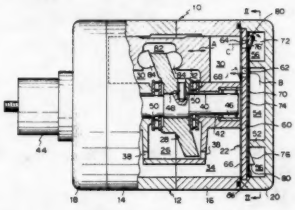
Hayato Ikeda; Hisato Kawamura, and Shinichi Ishihara, all of Kariya, Japan, assignors to Kabushiki Kaisha Toyoda Jidoshokki Seisakusho, Aichi, Japan

Filed Mar. 9, 1988, Ser. No. 166,443

Claims priority, application Japan, Mar. 11, 1987, 62-036109[U]

Int. Cl.[4] F04B *25/04, 39/10*

U.S. Cl. 417—269 **5 Claims**



1. A multi-piston swash plate type compressor for an air-conditioning system used in a vehicle such as an automobile, which comprises:

a cylinder block means in which a swash plate chamber is formed for receiving a swash plate member, and which has cylinder bores radially formed and arranged with respect to a central axis thereof, each of said cylinder bores receiving a piston member so as to be slidably engaged with said swash plate member to reciprocate said piston member in the corresponding cylinder bore by rotation of said swash plate member, said swash plate member being fixedly mounted on a shaft member which extends into said swash plate chamber through an axial bore formed in said cylinder block means, and which is adapted to be connected to a prime mover of the vehicle for rotation of said swash plate member;

housing means provided on said cylinder block means for forming a suction chamber which is communicated with said cylinder bores through the intermediary of a suction reed valve element and a discharge chamber which is communicated with said cylinder bores through the intermediary of a discharge reed valve element, said suction chamber being in communication with an evaporator of the air-conditioning system so as to be fed with a refrigerant including lubricating oil therefrom, said discharge chamber being in communication with a condenser of the air-conditioning system for feeding a compressed refrigerant thereto; and

means for guiding all of a compressed refrigerant discharged through said discharge reed valve element to impinge on a peripheral and interior wall surface of said discharge chamber so as to separate a lubricating oil from the discharged refrigerant, whereby the separated lubricating oil serves as an oil source for forming an effective damping and sealing oil layer between said discharge reed valve element and the valve seat thereof, said means also restraining a lift of said discharge reed valve element.

4,886,425

CAPACITY CONTROL DEVICE OF SCROLL-TYPE FLUID COMPRESSOR

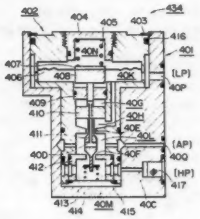
Tsutomu Itahana; Tetsuo Ono, both of Nagoya City, and Tamio Sugimoto, Nishikasugai, all of Japan, assignors to Mitsubishi Jukogyo Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 25, 1988, Ser. No. 173,712

Claims priority, application Japan, Mar. 26, 1987, 62-43418[U]

Int. Cl.[4] F04B *49/02*

U.S. Cl. 417—309 **5 Claims**



1. A capacity control device of a scroll-type fluid compressor including a stationary spiral element and a revolving spiral element having a substantially identical configuration and fitted to each other, a center of the revolving spiral element being revolved in solar-orbital motion along a circumference around a center of the stationary spiral element so that fluid is sucked in at a suction location, compressed and delivered at a high pressure discharge; a fluid actuated actuator which controls an amount of fluid bypassed from a compression chamber formed between contacts of both the spiral elements into a suction chamber, feedback mechanism means connected to fluid at said suction location, connected to fluid at said high pressure discharge and connected to said actuator to provide actuating fluid, said feedback mechanism means for maintaining a relation between a suction pressure of fluid at said suction location and a pressure of the actuating fluid which is linear to control said actuator to maintain the suction substantially constant.

4,886,426

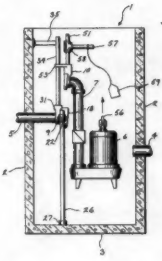
SUBMERGIBLE PUMP CONNECTING EJECTOR ADAPTER AND GUIDE RAIL ASSEMBLY

John J. Surinak, 2 Earling Ct., Oconomowoc, Wis. 53066

Continuation of Ser. No. 148,018, Jan. 25, 1988, abandoned. This application May 9, 1989, Ser. No. 349,872

Int. Cl.[4] E04B *17/00, 35/00*

U.S. Cl. 417—360 **4 Claims**



1. An ejector adapter and guide rail assembly for coupling an opening of a discharge outlet of a submergible pump with an

inlet opening of a discharge pipe through with waste water is discharged from a sump, comprising:

a first coupling member fixedly mounted at the inlet opening of said discharge pipe;

a second coupling member fixedly mounted at the outlet opening of said submergible pump;

coupling means on one of said coupling members for cooperation with the other of said coupling members to permit selective coupling and uncoupling of said discharge outlet and discharge pipe during vertical movement of said discharge outlet and pump with respect to said discharge pipe so that the openings thereof are in registering relating with each other when said coupling members are in coupled relation and are in non-registering relation with each other when said coupling members are in uncoupled relation;

a vertical guide rail having a lower end connected to said first coupling member and an upper end extending vertically upwardly from said first coupling member, said guide rail defining a vertical longitudinal axis and comprising a tubular shaped member having a pair of oppositely disposed arcuate shaped peripheral surfaces;

guide means on said second coupling member for engaging said guide rail to guide said second coupling member, discharge outlet and pump along said guide rail during vertical movement thereof for removal thereof from said sump, said guides means comprises a non-encircling rail-engaging member including a bifurcated member having a pair of spaced elongated rail-engaging elements each having an inner surface disposed on opposite sides of said guide rail to tangentially engage said arcuate shaped peripheral surfaces of said guide rail to provide only two axially sliding line contacts therewith during vertical movement on said guide rail, and said rail-engaging elements extend substantially horizontally to permit movement of said second coupling member longitudinally with respect to said rail-engaging elements and spaced laterally from one another a sufficient distance to permit said vertical sliding movement but to prevent any substantial lateral movement of said second coupling member with respect to said rail-engaging elements; and

lift means connected to said second coupling member for raising and lowering said submergible pump on said guide rail for selective coupling and uncoupling of said discharge outlet and discharge pipe.

4,886,427

HERMETIC SCROLL COMPRESSOR WITH PASSAGE GROUP FOR DISCHARGED FLUID

Kazuo Sakurai, Shizuoka, and Takahiro Tamura, Shimizu, both of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Feb. 5, 1988, Ser. No. 152,649

Claims priority, application Japan, Feb. 28, 1987, 62-45698

Int. Cl.[4] F04B *35/04*; F04C *18/04, 29/02*

U.S. Cl. 417—369 **8 Claims**

1. A hermetic scroll compressor comprising:

a closed housing;

a compressor component arranged in an upper portion of said closed housing comprising a fixed scroll, an orbiting scroll in mesh with said fixed scroll, and a frame fixedly connected to said fixed scroll and supporting said orbiting scroll for orbiting motion, said frame having a peripheral surface and close contact with an inner peripheral wall surface of said closed housing;

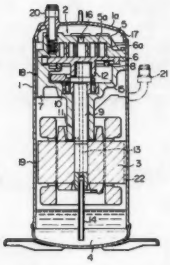
an electric motor arranged below said compressor component for driving said orbiting scroll, said electric motor having a rotor;

a lubricating oil reservoir defined in a bottom of said closed housing below said electric motor;

a discharge pipe connected to a space between said compressor component and said electric motor and communicating with the outside of said closed housing;

a discharge port provided at a center of said fixed scroll such that compressed refrigerant gas containing lubricating oil is discharged from said discharge port to a space above said compressor component;

at least one passage group of a plurality of vertically extending passages for communicating the space above said compressor component with the space between said compressor component and said electric motor, said passages of said at least one passage group being defined by the inner peripheral wall surface of said closed housing and a plurality of vertically extending grooves formed in the peripheral surface of said frame, one of said passages of said at least one passage group being higher in fluid resistance than the remaining passages, wherein said passage



having the high fluid resistance is longer than the remaining passages; and

a passage provided at a part of a periphery of said electric motor for communicating the space above said electric motor with said lubricating oil reservoir below said electric motor, said passage having a high fluid resistance being vertically aligned with said passage provided at the periphery of said electric motor, and wherein said discharge pipe is connected to said closed housing at a location remote from said passages of said at least one passage group as viewed in a rotational direction of the rotor of said electric motor.

4,886,428

PUMP ARRANGEMENT, PARTICULARLY FOR PUMPING WATER FROM DEEP WELLS

Björn Olofsson, Mangatan 44, S-195 00 Märsta, Sweden

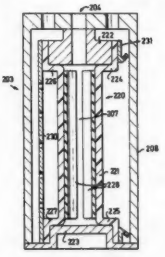
Division of Ser. No. 101,297, Aug. 31, 1987, Pat. No. 4,822,257.

This application Aug. 24, 1988, Ser. No. 235,928

Claims priority, application Sweden, Jan. 16, 1986, 8600190; May 16, 1986, 8602244

Int. Cl.[4] F04B *43/10, 47/04*

U.S. Cl. 417—389 **6 Claims**



1. In a pump arrangement for pumping water from deep wells, in which a feed pump unit (2) located at ground level

transmits power and motion to a delivery pump unit (3) to raise water through a delivery pipe (5) connected to the delivery pump unit (3) via a pressure valve (10) during a working stroke and to draw water into the delivery pump unit through a well-water inlet pipe via a suction valve (11) during a return stroke; the improvement comprising a compressible and expandable chamber (6) incorporated in the feed pump unit (2) and connected to a similarly compressible and expandable chamber incorporated in the delivery pump unit by means of a hydraulic line; the two chambers and the hydraulic line together forming a closed hydraulic system; and a return spring for supporting the compression of the chamber of the delivery pump unit during said return stroke, the chamber of the delivery pump unit comprising a bellows-cylinder which can be dilated solely in the radial direction, the bellows-cylinder (220, 320) comprising a hose-like body (221, 321) made of a flexible material, the ends (224, 225, 324, 325) of which body are firmly connected to plate-like holder elements (222, 223, 322, 323) which project outwardly from the housing and the diameters of which exceed the diameter of the main part of the hose-like body in the unloaded state of the bellows-cylinder when the bellows-cylinder is solely loaded by the liquid column in the hydraulic line; the main part (221, 321) of the hose-like body being connected to said end parts by means of end connecting parts (226, 227, 326, 327) which, in the unloaded state of the bellows-cylinder, abut end surfaces of the holder elements and extend at right angles to the main part of the hose-like body; the return spring for the chamber of the delivery pump unit comprising rubber springs (228) firmly connected to the hose-life body (221).

4,886,429

ELECTROMAGNETIC PUMP

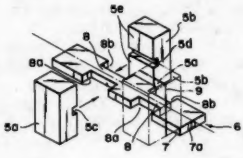
Toshio Osada, and Masaaki Tanabe, both of Tokyo, Japan, assignors to Man Design Co., Ltd., Tokyo, Japan

Filed Jul. 14, 1988, Ser. No. 218,962

Claims priority, application Japan, Jul. 17, 1987, 62-109083[U]

Int. Cl.[4] F04B *35/04, 43/04, 45/04*

U.S. Cl. 417—413 **3 Claims**



1. An electromagnetic pump comprising:

fluid operation chambers into which fluid is sequentially admitted and discharged;

an electromagnet connected to an AC power source device for polarity switching for every half cycle of AC when energized;

a reciprocative shaft, including at least one permanent magnet which moves between opposing magnetic poles of said electromagnet crossing the magnetic line of force, being reciprocated parallel with said magnetic poles when said electromagnet is energized;

a diaphragm attached at either end of said reciprocative shaft and partially defining each of said fluid operation chambers, for admitting and discharging fluid by enlarging or contracting the volume of said chamber as said reciprocative shaft reciprocates;

wherein said reciprocative shaft comprises an elongated, substantially flat member, provided with at least one narrow portion for holding said permanent magnet and a pair of notch portions formed at both sides opposing each other in the direction of the width of said shaft; and

said at least one permanent magnet comprising a pair of permanent magnet pieces whose thickness is approximately half of the width of said shaft, and wherein opposing faces of the permanent pieces have grooves formed therein, engaged with the narrow portions of said reciprocative shaft, and wherein said permanent magnet pieces are bonded together therewith.

4,886,430

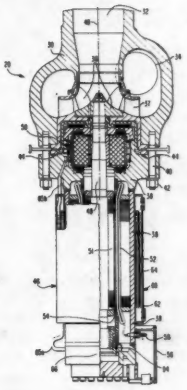
CANNED PUMP HAVING A HIGH INERTIA FLYWHEEL

Luciano Veronesi, O'Hara Twp., Allegheny County, and ALbert A. Raimondi, Monroeville Borough, Allegheny County, both of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Jul. 18, 1988, Ser. No. 220,720

Int. Cl.[4] F04B *39/00*

U.S. Cl. 417—423.13 **20 Claims**



1. A pump comprising:

a. a shaft;

b. an impeller mounted on said shaft for pumping a fluid;

c. drive means engaged with said shaft for turning said impeller;

d. a flywheel mounted on said shaft, said flywheel having a first end surface, a second end surface, and an outer circumferential surface; and

e. radial bearing means substantially mating with said circumferential surface.

4,886,431

PERISTALTIC PUMP HAVING INDEPENDENTLY ADJUSTABLE CARTRIDGES

Charles E. Soderquist, and James P. Beck, both of Barrington, Ill., assignors to Cole-Parmer Instrument Company, Chicago, Ill.

Filed Apr. 29, 1988, Ser. No. 188,286

Int. Cl.[4] F04B *43/12*

U.S. Cl. 417—477 **12 Claims**

1. A peristaltic pump comprising:

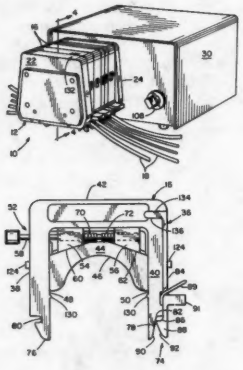
a drive unit including a stationary frame and a rotor supported on said frame for rotation; and

a plurality of removable cartridges disposed side-by-side on said drive unit;

said rotor having a generally horizontal axis and including rotatable support means and a plurality of elongated, parallel rollers, said rollers being carried by said rotatable support means in a circular path about the axis of the rotor, each roller further having its own axis of rotation and being rotatable thereabout;

each of said removable cartridges comprising a three-side

cartridge frame which includes first and second generally vertical side members and a generally horizontal top member connecting said side members, a generally horizontal occlusion bed disposed between said side members and mounted in slidable engagement with the inner surfaces of said side members, and adjustment means for adjusting the position of said occlusion bed to enable precise selection of the degree of occlusion;



each of said removable cartridges being configured for cooperation with said drive unit so that for each cartridge a length of flexible tubing may be supported between the occlusion bed and the rotor to enable effectuation of peristaltic pumping of fluid through said length of tubing by rotation of said rotor;

each said occlusion bed having a pressure surface which approximately defines a radius about the axis of said rotor;

said adjustment means being operative to displace said occlusion bed in rectilinear motion.

4,886,432

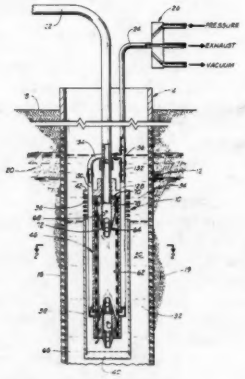
BLADDER PUMP ASSEMBLY

Denver K. Kimberlin, Norman, Okla., assignor to Engineering Enterprises, Inc., Norman, Okla.

Filed Jun. 23, 1988, Ser. No. 210,332

Int. Cl.[4] F04B *43/08*

U.S. Cl. 417—478 **9 Claims**



9. A bladder pump assembly comprising:

an external skimmer tube having a closed bottom, and an upper end;

means for admitting liquid to the interior of the skimmer tube from a location near the upper end thereof;

a cylindrical bladder support chamber positioned concentrically within the external skimmer tube, and defining an annular space therewith, said bladder support chamber having a lower end spaced upwardly from the closed bottom of said skimmer tube and having an upper end;

a flexible, two-part bladder positioned within said cylindrical support chamber, said two-part bladder comprising a pair of superimposed sheets of flexible material having opposite side edges secured together to form a fluid tight enclosure between said sheets, said flexible bladder being positioned relatively near to the inner wall of at least a major portion of said support chamber at one time during the operation of said bladder pump as compared to the bladder's position at a different time during the operation of the bladder pump, and capable of flexing radially inwardly from its position relatively near to said inner wall toward the axis of said cylindrical support chamber;

a lower check valve assembly pressed into the lower end of the bladder support chamber and having the lower end of said bladder positioned therearound and sealed therearound so that said lower check valve assembly communicates with the interior of said bladder said lower check valve assembly functioning to open to admit liquid into said bladder from said annular space, and from said space between said support chamber lower end and said skimmer tube lower end when no pressure is applied to the outer side of said flexible chamber;

an upper check valve assembly pressed into the upper end of the bladder support chamber and having the upper end of said bladder extending therearound and sealed therearound, and said upper check valve assembly communicating with the interior of the bladder, said upper check valve assembly functioning to open to permit the discharge of liquid therethrough from the interior of said bladder when air under pressure is introduced between said bladder and said bladder support chamber;

a liquid discharge pipe connected to said upper check valve assembly for receiving liquid pumped through said upper check valve assembly from the interior of the bladder; and

a remote pneumatic pump cycle control system connected to the bladder support chamber for delivering air under pressure to the space between said bladder and said bladder support chamber, and for evacuating the space between the bladder and the bladder support chamber following the radially inward collapse of the bladder by air under pressure.

4,886,433

DISPLACEMENT MACHINE HAVING SPIRAL CHAMBER AND DISPLACEMENT MEMBER OF INCREASING RADIAL WIDTHS

Hans P. Maier, Zurich, Switzerland, assignor to Agintec AG, Zurich, Switzerland

Filed Jun. 15, 1988, Ser. No. 206,721

Claims priority, application Fed. Rep. of Germany, Jun. 15, 1987, 3719950

Int. Cl.[4] F01C *1/04*

U.S. Cl. 418—55 **10 Claims**

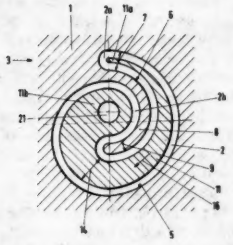
1. A displacement machine for fluids, comprising:

a casing member having a displacement chamber therein, said chamber being a groove having inner and outer peripheral walls and extending from an inlet to an outlet, said groove being a spiral exceeding 360°;

displacement means provided with inner and outer peripheral walls corresponding to said chamber walls, said displacement means being eccentrically mounted in said chamber for circulating, twist-free movement therein in such a manner that said corresponding walls touch in a continuously progressing sealing line;

said displacement means having a looping angle of less than about 400°;

said chamber and said displacement means, respectively having correspondingly increasing radial widths from a first to a second end thereof;



said displacement means being eccentrically mounted adjacent the second end thereof;

said outlet being positioned adjacent said second end; and

said displacement means provided to be driven in a direction corresponding to the increase in said radial width.

4,886,434

SCROLL COMPRESSOR HAVING DISCHARGE PART COMMUNICATING WITH TWO COMPRESSION SPACES SIMULTANEOUSLY

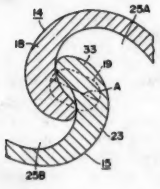
Aritomo Satow, Fukuya; Shinichi Masuda, Isesaki; Kazuyoshi Sugimoto, and Yuji Muta, both of Oizumi, all of Japan, assignors to Sanyo Electric Co., Ltd., Osaka, Japan

Filed Feb. 12, 1988, Ser. No. 155,531

Claims priority, application Japan, Feb. 20, 1987, 62-38259; Mar. 2, 1987, 62-47377; Mar. 2, 1987, 62-47378; Apr. 10, 1987, 62-89033

Int. Cl.[4] F04C *18/04*

U.S. Cl. 418—55 D **2 Claims**



1. A scroll compressor comprising:

a sealed container, a compressor unit disposed in an upper portion of said sealed container, and an electric motor unit disposed in a lower portion of said sealed container, wherein said compressor unit comprises:

a fixed scroll member having an end plate and a wrap attached to one surface of said end plate and having the shape of an involute curve, and

an orbiting scroll member have an end plate and an orbiting scroll wrap attached to one surface of said end plate of the orbiting scroll member in a juxtaposed relation with said fixed scroll member so that the wraps of the two scroll members are fitted closely together to form a plurality of compression spaces, said orbiting scroll wrap having a constant thickness along substantially all its length,

said compression spaces being defined gradually from an outer side of said scroll members toward an inner side thereof and formed symmetrically with respect to a center of said fixed scroll member,

said end plate of the fixed scroll member having a circular discharge port for discharging therethrough a refrigerant compressed in said compression spaces,

the center of said discharge port of said fixed scroll member being offset from the center of a basic circle of the wrap of said fixed scroll member toward the winding starting end of the wrap of said fixed scroll member and having a size for causing said compression spaces to be connected to said discharge port simultaneously so that the fluid in said compression spaces is discharged simultaneously from said discharge port to prevent pressure difference between said compression spaces.

4,886,435

SCROLL COMPRESSOR WITH INTERMITTENT OIL SUPPLY PASSAGE

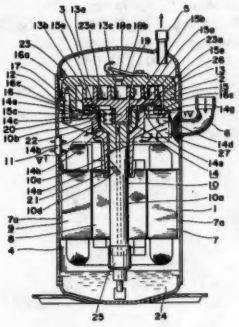
Kiyoshi Sawai, Kusatsu; Shuuichi Yamamoto, Kyoto; Hiroshi Morokoshi, Yasu; Michio Yamamura, and Shigeru Muramatsu, both of Kusatsu, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Mar. 14, 1988, Ser. No. 167,844

Claims priority, application Japan, Mar. 12, 1987, 62-57133; Mar. 20, 1987, 62-66315; Apr. 30, 1987, 62-106668

Int. Cl.[4] F04C *18/04, 29/02*

U.S. Cl. 418—55 **22 Claims**



1. A scroll compressor for compressing a cooling medium in a refrigerating cycle, comprising:

a compressor casing;

a scroll compressor unit provided in said compressor casing;

drive means for driving said scroll compressor unit to compress said cooling medium; and

an oil sump in said casing;

said scroll compressor unit comprising:

a fixed scroll member fixed inside said casing, said fixed scroll member having a fixed mirror plate and a fixed spiral vane on one surface of said fixed mirror plate;

an orbiting scroll member having an orbiting mirror plate and an orbiting spiral vane on one surface of said orbiting mirror plate, said orbiting mirror plate arranged such that said orbiting spiral vane is meshed with said fixed spiral

vane of said fixed scroll member, said orbiting scroll member driven by said drive means so as to compress said cooling medium, said drive means including a crankshaft;

a bearing member having a bearing surface for supporting said crankshaft and a bearing surface for supporting said orbiting scroll member;

a thrust bearing disposed on said bearing surface of said bearing member for supporting said orbiting scroll member and having an upper thrust bearing surface supporting an opposite surface of said orbiting mirror plate of said orbiting scroll member, such that said bearing member supports said orbiting scroll member via said thrust bearing;

rotation restriction means for restricting the rotation of said orbiting scroll member, said rotation restriction means comprising a reciprocably movable ring member surrounding said thrust bearing;

an expansion space defined by an inner peripheral surface of said ring member, said opposite surface of said orbiting mirror plate, an outer peripheral surface of said thrust bearing, and said bearing surface of said bearing member, said expansion space expanding and contracting with reciprocal movement of said ring member;

a plurality of oil grooves on said upper thrust bearing surface of said thrust bearing;

means for delivering oil from said oil sump to said oil grooves of said thrust bearing; and

expansion space oil supply means for intermittently providing a supply of oil from said plurality of oil grooves on said upper bearing surface of said thrust bearing to said expansion space, said expansion space oil supply means provided on said opposite surface of said orbiting mirror plate of said orbiting scroll member.

4,886,436

LUBRICATING ARRANGEMENT FOR A SHAFT SEAL IN A VANE TYPE COMPRESSOR

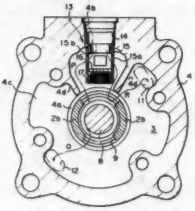
Shigeru Suzuki; Katsuhiko Ohshiro, and Ichiro Kasugai, all of Kariya, Japan, assignors to Kabushiki Kaisha Toyoda Jidoshokki Seisakusho, Aichi, Japan

Filed Sep. 7, 1988, Ser. No. 241,358

Claims priority, application Japan, Sep. 12, 1987, 62-229185

Int. Cl.[4] F01C *21/04*; F04C *29/02*

U.S. Cl. 418—100 **7 Claims**



1. A vane type compressor comprising:

a main housing having a cylinder with a cylinder bore formed therein;

a front side plate covering one end of said cylinder bore, said front side plate having a central boss and at least one suction port for an admission to said cylinder bore of a fluid to be compressed;

a front housing mounted on said main housing at one end thereof over said front side plate and forming a suction chamber between said front housing and said front side plate, said front housing having an end wall with a central boss and a peripheral wall with an inlet formed therethrough for an admission of said fluid from the exterior of the compressor into said suction chamber;

a rotor inserted in said cylinder bore and secured on a rotatable shaft, said rotatable shaft extending through said central boss of said front side plate and said central boss of said front housing;

a check valve arranged in said front housing at said inlet to prevent a flow of said fluid from said suction chamber to the exterior of the compressor, said check valve comprising a tubular valve body extending radially of said front housing and having a tubular hollow wall, a valve seat in said tubular valve body, at least one valve port laterally opening through said tubular hollow wall adjacent to said valve seat, a valve member movably inserted in said tubular valve body and engageable with said valve seat to open or close said at least one valve port, and a spring urging said valve member toward said valve seat;

a seal means arranged in said central boss of said front housing around said rotatable shaft for sealing said suction chamber; and

guide wall means provided in said suction chamber for guiding said fluid from said check valve toward said seal means, said guide wall means comprising a pair of guide walls extending longitudinally of said front housing radially on opposite sides of said check valve and between said check valve and said at least one suction port to constitute a passage therebetween for guiding said fluid from said check valve radially centrally in said suction chamber toward said seal means.

4,886,437

BEARING ARRANGEMENT OF AN EXTERNAL-AXIAL ROTARY PISTON BLOWER

Werner Schubert, Lindau, Fed. Rep. of Germany, assignor to Wankel GmbH, Berlin, Fed. Rep. of Germany

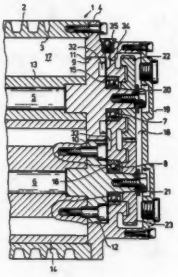
Continuation of Ser. No. 58,922, Jun. 5, 1987, Pat. No. 4,797,078. This application Oct. 28, 1988, Ser. No. 263,684

Claims priority, application Fed. Rep. of Germany, Jun. 11, 1986, 3619645

The portion of the term of this patent subsequent to Jan. 10, 2006, has been disclaimed.

Int. Cl.[4] F04C *10/18*

U.S. Cl. 418—206 **7 Claims**



1. In a bearing arrangement of an axial rotary piston blower for gaseous medium with a closed housing having a sidewall means forming working chambers with two internal intermeshing rotary pistons rotating on parallel shafts and journalled in antifriction bearings mounted on a side of a transmission gear means in a bearing collar means, said housing further consisting of an interior runway surface and two side plates and forming the working chambers with said rotary pistons rotating therein, whereby said parallel shafts upon which said rotary pistons are mounted have shaft ends journaled by said antifriction bearings with face seals laterally outside and extending radially in a location axially immediately adjacent to one side thereof for sealing-off of gas pressure in the working chambers, said antifriction bearings also having bearing collar means adjoining said shaft ends for mounting of said bearings

and said transmission gear means of said blower located externally of said bearings, said bearing collar means projecting outwardly from the sidewall means of said housing and forming outwardly radial grooves around shoulders thereof whereby an oil seal of said antifriction bearings between these antifriction bearings and the working chambers in said closed housing for each antifriction bearing is formed by two gap seals and an annular space for buffering pulsation impacts of said rotary piston blower and located between these gap seals having the improvement in combination therewith comprising:

annular groove means which are open in a direction extending radially outwardly around said bearing collar means of said antifriction bearings of said shafts of the rotary pistons; and

radially located walls provided on the transmission gear means side of said annular groove means opposed to inner recess edges of the transmission gear means forming therewith an annular gap of closest narrow tolerance extending axially therebetween in a contactless manner and forming sealing gaps therewith.

4,886,438

METHOD AND APPARATUS OF EXTRUDING A PLASTIC PIPE UNDER CONTROL OF THE WALL THICKNESS OF THE EXTRUDED PLASTIC PIPE

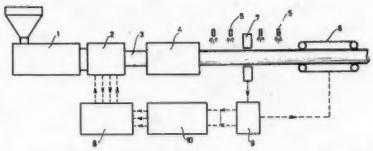
Koos Börger, Orionlaan 50, and Hans Overeijnder, Mercuriuslaan 6, both of, Hardenberg, Netherlands

Division of Ser. No. 885,073, Jul. 14, 1986, Pat. No. 4,749,531, which is a continuation of Ser. No. 686,535, Dec. 26, 1984, abandoned. This application Mar. 2, 1988, Ser. No. 163,029

Claims priority, application Netherlands, Dec. 27, 1983, 8304451

Int. Cl.[4] B29C *47/92*

U.S. Cl. 425—141 **5 Claims**



1. Apparatus for extruding a solid rigid plastic pipe of a thermoplastic polymer and controlling the wall thickness of the extruded pipe, said apparatus comprising a twin screw extruder with an entrusion die excluding inflation means and disposed about said die heating elements in the absence of cooling elements for controlling the temperature in each of a plurality of temperature controlled sectors, circumferential average temperature measuring means at least one wall thickness measuring device for measuring the wall thickness of an extruded pipe, said measuring device being rotatable about the circumference of the pipe and being operable to perform measurements in each of a plurality of measuring sectors equally distributed about the pipe periphery located in the axial extension of the temperature controlled sectors, an element for comparing a wall thickness measuring value with another wall thickness value, a device connected with the heating means and speed controllable drawing means for drawing off the plastic pipe body leaving the extrusion die, the wall thickness measuring device being operable to transmit signals representative of such measurements to a signal processing unit wherein the measurement signals are averaged and the signals measured in all measuring sectors are jointly transmitted to a wall thickness controlling unit connected thereto, said thickness control unit comprising a signal, processing unit for determining sector averages and circumferential temperature average for the pipe and a comparator element for comparing the sector temperature average with the circumferential temperature average, said comparator element being capable of acting upon a temperature control device for controlling the temperature of said heating elements in the absence of cooling means in a temperature controlled sector located in the axial extension of the one measuring sector as a function of the observed difference between the sector average and the circumference average so as to remove the measured thickness difference, said heating being effective to affect only the temperature of a superficial layer of the plastic pipe body and thus reducing or increasing the friction between the outerside of the plastic pipe body and the opposite inner surface of the die part, a too small wall thickness being increased by increasing the temperature and a too high wall thickness being decreased by decreasing the temperature in said temperature controlled sectors, and control means connected with the signal processing unit for controlling the speed of the drawing means by using the difference between the minimum value of the wall thickness as desired and the minimum value of the wall thickness as determined in the signal processing unit starting from the signals coming from the wall thickness measuring device.

4,886,439

OPENABLE AND CLOSEABLE NOZZLE FOR THE PLASTICIZING CYLINDER OF AN INJECTION MOLDING MACHINE

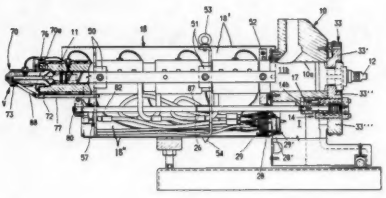
Karl Hehl, Arthur-Hehl-Strasse 32, D-7298 Lossburg 1, Fed. Rep. of Germany

Filed Dec. 27, 1988, Ser. No. 289,821

Claims priority, application Fed. Rep. of Germany, Dec. 30, 1987, 3744519; European Pat. Off., Feb. 24, 1988, EP88102692.6

Int. Cl.[4] B29C *45/23*

U.S. Cl. 425—190 **9 Claims**



1. In a plasticizing unit for an injection molding machine; said plasticizing unit including

a carrier block;

a plasticizing cylinder through which plasticized material is driven; said plasticizing cylinder having a front end and a rear end;

securing means for attaching said plasticizing cylinder, at said rear end thereof to said carrier block;

an injection nozzle having a nozzle body including a front end and a rear end; said rear end of said nozzle body being connected to said front end of said plasticizing cylinder; said nozzle body having a discharge outlet at the front end of said nozzle body;

a valve needle cooperating with said discharge outlet and having a closed position shutting off the discharge outlet and an open position allowing discharge of material from said plasticizing cylinder through said discharge outlet;

at least one force-transmitting linkage means comprising joints at opposite ends and being connected to said valve needle; and

power means for displacing said at least one force-transmitting linkage means and said valve needle into a selected one of said open and closed positions;

the improvement wherein said nozzle body has

(a) a throughgoing, linear, unobstructed nozzle channel extending within the nozzle body from the rear end of

said nozzle body to said discharge outlet and being in an axial alignment with said plasticizing cylinder;

(b) a guide channel extending within said nozzle body to said discharge outlet at an acute angle to said nozzle channel; said valve needle being slidably received in said guide channel;

(c) said at least one force-transmitting linkage means being guided and being connected to said power means;

(d) coupling means for connecting said at least one force-transmitting linkage means to said power means and for disconnecting said at least one force-transmitting linkage means from said power means;

(e) said power means mounted on said carrier block, comprising an axis of symmetry; said axis of symmetry of said power means being arranged at an angle to said valve needle; and

(f) said securing means mounted on said carrier block having a locking position for locking said plasticizing cylinder to said carrier block and a releasing position for allowing separation of said plasticizing cylinder from said carrier block.

4,886,440

APPARATUS FOR PRODUCING A RESTRUCTURED FOOD PRODUCT

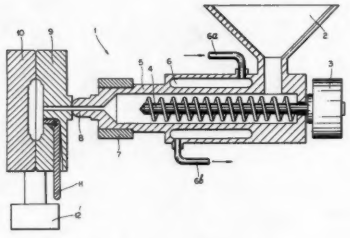
Alexander Forrest, 29 Bassett Dr., Bathurst 2798, and Anthony J. Gordon, "Godolphin" , East Guyong, Via Millthorpe, 2798 both of Australia

Filed Aug. 27, 1986, Ser. No. 901,289

Claims priority, application Australia, Aug. 28, 1985, PH2182

Int. Cl.[4] B29C *47/36*

U.S. Cl. 425—208 **8 Claims**



1. A moulding apparatus for producing a food product, the moulding apparatus comprising:

a barrel for containing a food mixture/formulation having a heat sensitive binding agent partially activatable at a temperature of from about 70° C. to about 120° C., the barrel having an inner surface and a delivery end;

barrel-cooler means for keeping the food mixture/formulation contained in the barrel in a preselected lower temperature range of from about 5° C. to about 60° C., whereby the heat sensitive binding agent of the food mixture/formulation in the barrel remains substantially unactivated;

a nozzle extending from the delivery end of the barrel;

feeding means comprising a screw operatively disposed in the barrel for feeding the food mixture/formulation from the barrel and through the nozzle under pressure and sufficient roughening on the inside of the barrel for reducing rotational slippage of the food mixture/formulation in the barrel during the feeding;

nozzle-heater means for heating the food mixture/formulation fed through the nozzle into an upper temperature range of from about 70° C. to about 120° C., whereby to activate partially the heat sensitive binding agent of the food mixture/formulation fed from the nozzle;

a mould communicating with the nozzle and having a mould cavity receiving the food mixture/formulation fed through the nozzle for forming the food mixture/formulation into a food product, the mould having first and second mould portions defining the mould cavity thereof movably engageable with each other to open and close the mould cavity; and

differential mould-heater means heating the food product in the second mould portion to a temperature higher than that in the first mould portion for facilitating release of the food product from within the mould cavity defined by the mould portions when the mould portions are moved to open the mould cavity.

4,886,441

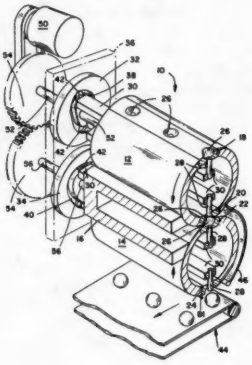
APPARATUS FOR FORMING THREE DIMENSIONAL FOOD PRODUCTS

James L. Lortz, Modesto, Calif., assignor to Food Equipment Engineering, Inc., Modesto, Calif.

Filed Nov. 6, 1987, Ser. No. 117,659

Int. Cl.[4] A22C *7/00*; A23P *1/02*

U.S. Cl. 425—236 **8 Claims**



1. In an apparatus used in the production of three dimensional molded food products said apparatus having a pair of contiguous cylinder-like continuously rotatable forming barrels adapted to form said three dimensional molded food products between mating surfaces of said barrels, a food material input chamber adapted to feed food material to said forming barrels, a molded food product output chute, means for rotating said forming barrels about parallel rotation axes, the exterior surfaces of at least one of said cylinder-like forming barrels having a molding cavity therein, said barrels contacting each other tangentially along their outer cylindrical surfaces to cause formation of said three dimensional molded food products from said food material fed from said input chamber to said cavity between said forming barrels, and means for the extraction of molded food products from said cavities to said food product output chute,

the improvements comprising:

(a) said forming barrels having end surfaces and a substantially smooth and geometrically true cylindrical exterior surface with at least one forming barrel having an axially extending opening along said cylindrical exterior surface, said opening extending:

(i) through at least one end surface of said forming barrel,

(ii) and radially inwardly toward the axis of rotation of said forming barrel,

(b) a removable forming bar in at least one of said forming barrels, said forming bar:

(i) extending axially along said cylindrical exterior surface of said forming barrel and in said axially extending opening therein,

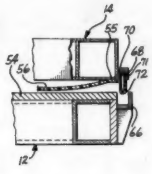
(ii) having a portion extending radially inwardly toward the axis of rotation of said forming barrel,
(iii) having an exterior surface having the same radius of formation as said cylindrical exterior surface of said forming barrel,
(iv) and adapted to be assembled into said forming barrel to form a substantially smooth continuous exterior cylindrical surface for said barrel without openings at mating surfaces,
(c) said forming bar being removable from and replaceable in said forming barrel,
(d) at least one cut-out portion formed into said forming bar defining said cavity for receiving said input food material for formation of said three dimensional food products,
(e) a movable means within said cavity, said movable means being movable radially with respect to the axis of said barrel,
(f) a means for moving said movable means in said radial movement, said means for moving being positioned within said barrel in radial alignment with said cavity,
(g) at least one cam means positioned with respect to the axis of rotation of said forming barrels,
(h) and a cam follower attached to said means for moving said movable means, said cam follower being positioned to follow said cam whereby upon alignment of said forming barrels to form a cavity said movable means is moved within said cavity in said forming bar during a portion of said rotation of said barrels to cause ejection of the food product,
(i) whereby said forming bar assembly including said forming bar, said means movable within said cavities and said means for moving said movable means is:
(i) visible from the exterior of said forming barrel when assembled into said forming barrel,
(ii) said forming bar assembly is removable as an assembly for inspection and cleaning,
(iii) the interior of said forming barrel is completely visible after removal from said forming barrel, and
(iv) said forming bar is adapted to be easily changed to a forming bar with a different cavity to permit the formation of three dimensional food products of differing configuration without changing a complete forming barrel.

4,886,442

VACUUM BAG TOOLING APPARATUS WITH INFLATABLE SEAL

Peter D. McCowin, Enumclaw, and Paul E. Nelson, Tacoma, both of Wash., assignors to The Boeing Company, Seattle, Wash.

Filed May 26, 1988, Ser. No. 199,004
Int. Cl.[4] B32B *35/00, 31/20*
U.S. Cl. 425—388 **8 Claims**



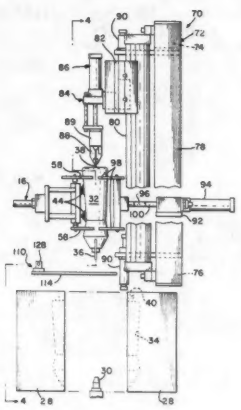
1. An apparatus for forming composite members, comprising:
a table portion having a tooling surface and an upwardly opening channel, said channel extending continuously around outside the perimeter of said surface;
a frame portion mountable to said table portion by lowering it onto said table portion, said frame portion including a sheet of airtight vacuum bagging material, said sheet covering said tooling surface when said frame portion is lowered onto said table portion; and
an elastomeric seal connected to said frame portion adjacent the periphery of said sheet, said seal including a continuous downwardly depending portion that is inflatable, wherein when said inflatable portion is in a deflated condition said inflatable portion is shaped and positioned for male/female fitment into said channel as said frame portion is lowered onto said table portion, and further, said inflatable portion being inflatable after such fitment is made, in a manner so as to cause said inflatable portion's outer walls to expand horizontally outwardly against the interior walls of said channel, to provide a substantially airtight seal around said tooling surface and between said surface and said sheet of vacuum bagging material.

4,886,443

BLOW MOLDED BOTTLE EXTRACTION, TRIMMING AND DISCHARGE APPARATUS

Paul W. Klinedinst, Windsor, and Thomas Smeltzer, York, both of Pa., assignors to Graham Engineering Corporation, York, Pa.

Division of Ser. No. 199,528, May 27, 1988, Pat. No. 4,834,643.
This application Apr. 27, 1989, Ser. No. 343,605
Int. Cl.[4] B29C *49/70*
U.S. Cl. 425—537 **8 Claims**



1. Apparatus for extracting a blow molded plastic bottle from a blow mold and transferring the bottle to a bottle holder comprising:
(a) a bottle gripping assembly for gripping a blow molded plastic bottle in a mold and releasing a bottle held in a pickup position;
(b) first drive means for moving the assembly and a gripped bottle along a path extending from a blow mold to the pickup position; and
(c) a tray located beneath the pickup position to catch deformed bottles falling down from such position upon release from the gripping assembly.

4,886,444

PROCESS FOR TREATING GASEOUS EFFLUENTS COMING FROM THE MANUFACTURE OF ELECTRONIC COMPONENTS AND INCINERATION APPARATUS FOR CARRYING OUT SAID PROCESS

Ikuo Hirase, Ibaraki, Japan, and Denis Rufin, Hinsdale, Ill., assignors to L'Air Liquide, Paris, France

Filed Jul. 11, 1988, Ser. No. 217,457
Claims priority, application France, Jun. 19, 1987, 87 08667
Int. Cl.[4] F23D *14/00*; F23G *7/08*; F23J *15/00*
U.S. Cl. 431—5 12 Claims

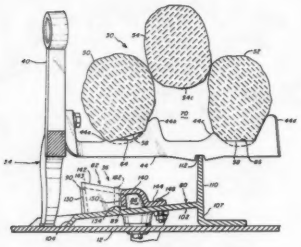
1. A process for continuously treating gaseous effluents of the CVD type by oxidation, wherein the effluent gases are aspirated by an inert vehicle gas, then intimately mixed with a preheated oxidizing gas, then remain in contact therewith at a sufficient temperature and for a sufficient period of time for the incineration, then the oxidizing products are cooled by thermal exchange to condensation, and the solid products of oxidation are collected and the residual gases washed, and there is realized a cascade of pressure drops along the gaseous current.

4,886,445

GAS BURNING ARTIFICIAL LOG ASSEMBLY

Stephen F. Richardson, Randolph Center, Vt., assignor to Vermont Castings, Inc., Randolph, Vt.

Filed Nov. 2, 1987, Ser. No. 115,887
Int. Cl.[4] F23Q *2/32*
U.S. Cl. 431—125 9 Claims



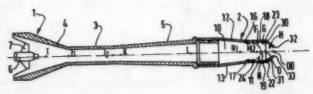
1. A gas burning artificial log assembly comprising:
a plurality of artificial logs;
gas burner means for providing a gas flame in the vicinity of said artificial logs, said gas burner means including
a burner pan having a bottom plate,
a burner manifold mounted on said bottom plate, said burner pan and said burner manifold defining a gas-carrying conduit including a rear gas exit slot aligned generally parallel to said artificial logs for producing a gas flame between said artificial logs and a front gas exit slot forward of said artificial logs for producing a gas flame in front of said artificial logs, and
means for introducing gas into said gas-carrying conduit; and
log support means for supporting said artificial logs above said gas burner means.

4,886,446

GAS BURNER OF THE COLD NOZZLE TYPE

Claude Courrege, Le Haillan, France, assignor to Stepack, France

Filed May 12, 1988, Ser. No. 193,476
Claims priority, application France, May 12, 1987, 87 06930
Int. Cl.[4] F23D *14/14*
U.S. Cl. 431—329 8 Claims



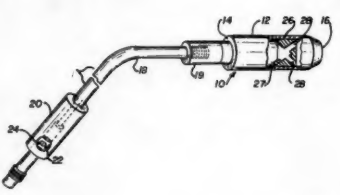
1. A gas burner of the cold nozzle type including an injection device adapted for producing a high speed flow of fuel gas mixture and injecting this flow into a tubular shaped burner head comprising successively:
i- a pressure recovery chamber having, in the plane of symmetry of the head, a divergent shape and inside which the gas mixture coming from the injection device develops in a fan configuration,
ii- an ignition chamber with two walls substantially parallel to said plane of symmetry,
iii- two deflectors which extend respectively the two walls of the ignition chamber and which converge towards each other, these two deflectors having two rectilinear front edges forming therebetween a passage of reduced width, and
iv- a diffusion grid a concave shape forming, inside the burner head, a convex dividing wall which separates the pressure recovery chamber from the ignition chamber, the concavity of this wall being oriented inwardly of the pressure recovery chamber, so that the lateral edges 24', 24" of this grid form with the two parallel walls flow paths for the gas flow in which combustion cannot take place, wherein the front edges of said walls to which the deflectors are connected, the front edges of these deflectors and the diffusion grid have circular shapes substantially coaxial to each other.

4,886,447

BURNER ASSEMBLY

Charles T. Goss, Glenshaw, Pa., assignor to Goss, Inc., Glenshaw, Pa.

Filed May 16, 1988, Ser. No. 194,310
Int. Cl.[4] F23D *14/02*
U.S. Cl. 431—353 16 Claims



1. A gas burner assembly, comprising:
an elongated, hollow housing having an entry and a discharge end separated by walls of the housing;

gas supply means attached to said housing for supplying a combustible gaseous mixture to said housing; and

directing means positioned within said housing for directing a plurality of streams of the combustible gaseous mixture through said housing, said stream being divided by said directing means such that part of the combustible gaseous mixture is caused to strike and be reflected from the walls of the housing and another part of said mixture is caused to emerge from said housing unimpeded by contact with walls of the housing;

said directing means including a slug spanning the cross section of said housing, a central bore extending into the side of said slug facing said gas supply means, and a plurality of outwardly directed straight cavities in the slug extending from said central bore to the side of the slug from which the gaseous mixture emerges, said cavities serving to direct part of the gaseous mixture passing therethrough against the walls of the housing.

4,886,448
SHAFT INSTALLATION FOR PROCESSING OF FUEL-CONTAINING SOLID MATERIALS

Peter Schurmann, Lowenweg 12, CH-8157 Dielsdorf, Switzerland; Jeschar Rudolf, Roseneck 1, D- 3380 Goslar 1, and Frisch Volker, Schillerstrasse 4, D-3360 Osterode am Harz, both of Fed. Rep. of Germany

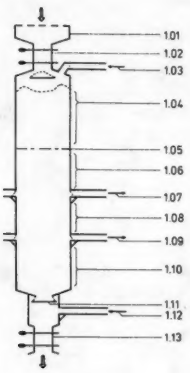
PCT No. PCT/CH87/00135, § 371 Date Jul. 21, 1988, § 102(e) Date Jul. 21, 1988, PCT Pub. No. WO88/02465, PCT Pub. Date Apr. 7, 1988

PCT Filed Oct. 5, 1987, Ser. No. 218,125

Claims priority, application Switzerland, Oct. 6, 1986, 39801/86

Int. Cl.[4] F27B *15/00*

U.S. Cl. 432—99 **5 Claims**



1. A shaft installation having a vertical shaft having a plurality of sections in series including a preheating section, a combustion section, a neutral section, and a cooling section comprising:

(a) a charging means at the top of said furnace through which solid materials containing volatile components used as fuel are fed in a downward direction;

(b) gas inlet means near the top of said furnace for introducing combustion gas which flows downwardly and concurrently with the solid materials in an upper preheating section where the solid material is partially combusted and then through the combustion section where the solid material is completely combusted;

(c) gas outlet means at the lower end of the combustion section for removing product gases formed in the preheating and combustion sections from the furnace,

(d) a neutral section of said furnace wherein the combusted solids flow downwardly into the top of the cooling section;

(e) second gas outlet means at the top of said cooling section for removing cooling gases from the cooling section and the furnace;

(f) a cooling section where the downwardly moving solids flow counter-current to upwardly flowing cooling gas introduced into the furnace through second gas inlet means at the bottom of the cooling section and the furnace.

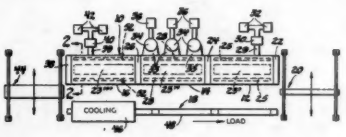
4,886,449
VACUUM BRAZING OF ALUMINUM ALLOY WORKPIECES

Craig E. Brittin, Lockport, N.Y., assignor to General Motors Corporation, Detroit, Mich.

Division of Ser. No. 937,888, Dec. 4, 1982. This application Jun. 10, 1988, Ser. No. 204,830

Int. Cl.[4] F27B *9/02*

U.S. Cl. 432—121 **2 Claims**



1. A furnace for vacuum brazing magnesium containing aluminum alloy workpieces, said furnace comprising a brazing chamber and an exit chamber, means for sequentially transporting the workpieces into and through said chambers and means comprising doors for isolating said chambers for each other and the ambient when the workpieces are being treated therein, the brazing chamber being adapted to accommodate heating of such workpieces to a brazing temperature at a sufficiently low pressure for magnesium gettered brazing to occur, the exit chamber comprising chamber defining walls and being adapted to initially receive hot brazed workpieces transported from the brazing chamber through a doorway between them at an exit chamber pressure compatible with the pressure in the brazing chamber, the exit chamber further comprising solid barriers to thermal radiation interposed between the hot workpieces and exit chamber walls.

4,886,450
COOLED TUBULAR ASSEMBLY FOR INDUSTRIAL REHEATING FURNACE

Helmut Heuss, Ratingen, Fed. Rep. of Germany, assignor to Ruhrgas Aktiengesellschaft, Essen, Fed. Rep. of Germany

Filed Jul. 27, 1988, Ser. No. 225,063

Claims priority, application Fed. Rep. of Germany, Aug. 1, 1987, 3725607

Int. Cl.[4] F27D *3/00*

U.S. Cl. 432—235 **12 Claims**

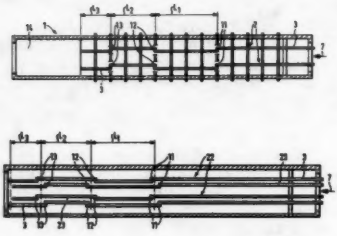
1. An industrial reheating furnace comprising

at least one inlet through which the charge to be reheated enters said furnace,

at least one exit through which reheated charge in said furnace leaves said furnace; and

means to support said charge as said charge moves through said furnace from said inlet to said exit in a direction of charge travel, said support means consisting of a cooled tubular assembly comprising at least one tubular support entending in said direction of charge travel from said inlet in the direction of said exit and being provided with riders carrying said charge at least over a section of said tubular support, said tubular support having at least two longitudinal sections each being laterally offset relative to said other tubular support section by a distance being at least

equal to the width of said tubular support wherein the length of each section so offset downstream with respect



to said direction of charge travel is shorter than the length of the immediately preceding upstream support section.

4,886,451

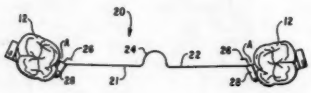
ORTHODONTIC APPLIANCES FOR DENTAL ARCH EXPANSION

Norman Cetlin, Newton, Mass., assignor to GAC International, Inc., Central Islip, N.Y.

Continuation of Ser. No. 911,408, Sep. 25, 1986, abandoned. This application Jan. 29, 1988, Ser. No. 150,201

Int. Cl.[4] A61C *7/00*

U.S. Cl. 433—7 **1 Claim**



1. A maxillary lingual sheath for receiving and securing a transpalatal bar, comprising:

mounting means for securing the sheath to a tooth; and

transpalatal bar receiving means for receiving the distal ends of said transpalatal bar, including a passage formed therethrough in a mesio-distal direction, said passage being mesially offset by an acute angle in relation to said mounting means for facilitating insertion of a transpalatal bar therein at an early stage of treatment to effect molar rotation.

4,886,452

DENTAL SPRAY HANDPIECE

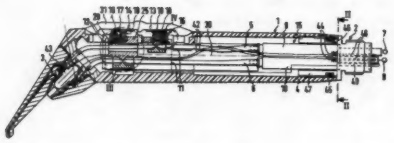
Gerd Löhn, Biberach/Rissegg, Fed. Rep. of Germany, assignor to Kaltenbach & Voigt GmbH & Co., Biberach/Riss, Fed. Rep. of Germany

Filed Sep. 27, 1988, Ser. No. 249,724

Claims priority, application Fed. Rep. of Germany, Oct. 14, 1987, 3734864

Int. Cl.[4] A61D *3/00*; **A61G** *17/02*

U.S. Cl. 433—32 **18 Claims**



1. Dental spray handpiece, consisting of a gripping sleeve having a media inlet connection at one end thereof and a media discharge at another end; to media conduits extending through said gripping sleeve from the media inlet connection to the media discharge and discharging outwardly therefrom, one said conduit being connected to a source of air and the other said conduit being connected to a source of water; electrical heating means with associated electrical current circuits for heating the media being associated with each of said two media conduits, said electrical heating means constituting a unitary structure which is detachably inserted into said gripping sleeve, said electrical heating means each being arranged in a heating tube connected with the media conduits, said tube being encompassed by a jacket tube with the formation of an annular gap at one end thereof communicating with the interior space of the heating tube, said jacket tube including an intermediate tube with the formation of an outer annular gap at the end thereof which is in communication with said inner annular gap; and a separate outer tube encompassing said jacket tube which is in communication with the media inlet connection.

4,886,453

BUILDING KIT FOR AN APPARATUS FOR MANUFACTURING TOTAL PROSTHEISES FOR UPPER AND LOWER JAWS

Horst Ludwigs, Lenbachstrasse 33, D-4800 Bielefeld 1, Fed. Rep. of Germany

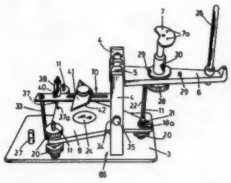
PCT No. PCT/EP87/00119, § 371 Date Oct. 26, 1987, § 102(e) Date Oct. 26, 1987, PCT Pub. No. WO87/05202, PCT Pub. Date Sep. 11, 1987

PCT Filed Feb. 27, 1987, Ser. No. 130,385

Claims priority, application Fed. Rep. of Germany, Jun. 27, 1986, 8617182[U]; Sep. 23, 1986, 8625405[U]; Feb. 27, 1987, 8605333[U]

Int. Cl.[4] A61C *11/00*

U.S. Cl. 433—54 **19 Claims**



1. Apparatus for preparing upper and lower jaw full prostheses, the apparatus comprising: p1 (a) an instrument holder comprising a baseplate, two upright pillars mounted on the baseplate and a support arm mounted between the two pillars for pivotal movement about a generally horizontal axis;

(b) a support platform for a jaw model supported on the baseplate of the instrument holder and including means by which the height and inclination of the support platform with respect to the baseplate can be adjusted;

(c) a lower jaw alignment member for determining the symphysis and trigoni points of the jaw model detachably supported by the pillars in a position above the said support platform, a stylus carried by the alignment member, means for adjusting the height of the stylus with respect to the symphysis point of the jaw model, a template for determining the trigoni of the jaw model carried by the alignment member, and means for adjusting the horizontal position of the template with respect to the alignment member to determine the trigoni;

(d) a second lower jaw alignment member selectively mounted by means of an adapter onto the support arm of the instrument holder, means for adjusting the height of the second alignment member with respect to the symphysis point of the jaw model, a template supported by the

second alignment member, and means for adjusting the horizontal position of the template with respect to the second alignment member to determine the trigoni;

(e) an impression plate selectively mounted by means of an adapter onto the support arm of the instrument holder for lower and/or upper jaw models;

(f) a mounting plate selectively mounted by means of an adapter onto the support arm of the instrument holder for lower and/or upper jaw models;

(g) an upper jaw model alignment plate selectively mounted by means of an adapter onto the support arm of the instrument holder, a stylus carried by the upper jaw model alignment plate, means carried by the upper jaw model which includes a guide edge whose position can be adjusted to the hard palate of the upper jaw model;

(h) a setting aid for enabling correct positioning of teeth in lower jaw full prostheses selectively mounted by means of an adapter onto the support arm of the instrument holder, the setting aid including a dome-shaped mount including means by which it can be fixed in a position opposite to a lower jaw model with sagittal and transverse compensation curve, and two pivotably mounted inserts lockable within the dome of the mount for adjustment of the central fissure line; and

(i) a tooth template selectively carried by the setting aid and comprising a dummy tooth formed with an insert arm whose position can be adjusted and locked in a position opposite to a lower jaw model with the mesial edge of the dummy tooth aligned in a sagittal direction on a centreline of the mount.

4,886,454

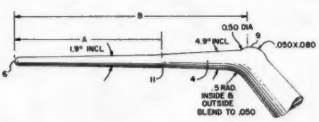
DENTAL PROBE

Bernard Loewenthal, 51 Heights Rd., Stratham, N.H. 03885, and G. Lawrence Thatcher, Chelmsford, Mass., assignors to Bernard Loewenthal, Stratham, N.H.

Continuation-in-part of Ser. No. 48,876, May 12, 1987, Pat. No. 4,768,952, which is a continuation-in-part of Ser. No. 937,409, Dec. 3, 1986, abandoned. This application Feb. 3, 1988, Ser. No. 151,907

Int. Cl.[4] A61C *19/04*

U.S. Cl. 433—72 **38 Claims**



1. A dental probe comprising:

(a) an elongated member having a flexible plastic distal end with a tip thereon; and

(b) said distal end comprising a pair of different substantially cylindrical tapered portions thereon, the rate of tapering of one portion being different from the rate of tapering of the other portion whereby the probe end achieves the proper strength and flexibility.

4,886,455

DENTAL SPRAY HANDPIECE

Gerd Löhn, Biberach/Rissegg, Fed. Rep. of Germany, assignor to Kaltenbach & Voigt GmbH & Co., Biberach an dero Risst, Fed. Rep. of Germany

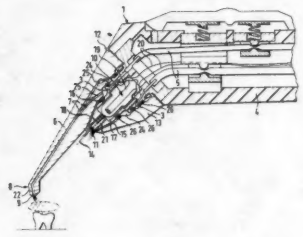
Filed Sep. 27, 1988, Ser. No. 249,725

Claims priority, application Fed. Rep. of Germany, Oct. 14, 1987, 3734863

Int. Cl.[4] A61G *17/02*

U.S. Cl. 433—80 **6 Claims**

1. Dental spray handpiece, consisting of a gripping sleeve having a media inlet connection at one end thereof and a media discharge at another end; a media conduit in said gripping sleeve leading from the media inlet connection to the media discharge; a cannula being detachably mounted at the end of the gripping sleeve towards the media discharge for passing on media discharged from the media discharge, said cannula having passageways for passing on of the media, including outlet orifices at the free end of the cannula for discharging into the open; and a light-emitting element in said handpiece for illuminating the region of the outlet orifices, said light-emitting element being arranged at the media-discharging end of the gripping sleeve, said cannula including a light-transmitting



aperture for the passage of light towards the region of the outlet orifices, said cannula incorporating a lateral thickened extension at the end opposite said free end, said extension having an insert opening with an axis directed towards the region of the outlet apertures for the detachable mounting of a plug extension projecting from the end surface of the gripping sleeve towards the media discharge, said thickened extension having an interior hollow space for the receipt of said light-emitting element, and a light-transmitting aperture for the light-emitted by the light-emitting element at the end distant from the gripping sleeve.

4,886,456

METHODS FOR FORMING DENTAL PROSTHESIS

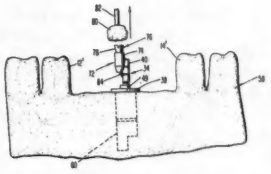
Stanley E. Ross, Boca Raton, Fla., assignor to Ross Systems Corporation, Palm Beach, Fla.

Division of Ser. No. 920,781, Oct. 20, 1986, Pat. No. 4,744,753. This application May 10, 1988, Ser. No. 192,128

The portion of the term of this patent subsequent to May 17, 2005, has been disclaimed.

Int. Cl.[4] A61C *8/00*

U.S. Cl. 433—173 **2 Claims**



1. A method of forming a dental prosthesis, comprising the steps of:

drilling a bore in a patient's jaw bone,

inserting into said bore an anchor formed of a material which is biocompatible with bone tissue, said anchor being apertured at a front end thereof and including an internally threaded opening at a rear end thereof which is accessible from within the patient's mouth,

inserting into said threaded opening an externally threaded stem of a pin, said pin including a post extending in a direction opposite said stem, said post being of non-symmetrical, non-circular cross-section,

forming an impression of at least a portion of said jaw includ-

ing said post, such that said post forms in said impression a cavity of non-symmetrical, non-circular cross-section,

removing said pin from said anchor and inserting said post into said cavity such that said threaded stem extends away from said impression,

threading a sheath onto said threaded stem,

pouring a hardenable substance into said impression to form a dental model in which said sheath is disposed, and such that said post is oriented in said model in the same position as when disposed in said anchor,

determining where to cut said post to a desired shape while said post is in said dental model,

cutting said post to that desired shape,

forming around said cut post a shaped mass of dimensionally stable, heat meltable material to achieve a desired shape thereof while said pin is in said dental model, and

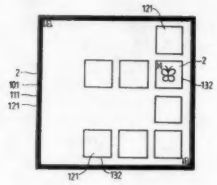
melting at least said heat meltable material and replacing same with a permanent material.

4,886,457

LEARNING AID TO ENLIGHTEN INTELLIGENCE FOR CHILDREN

Lin Lon-Jeng, 211, Ku Shan 2rd Road, Kaohsiung City, Taiwan

Filed Aug. 12, 1988, Ser. No. 231,363
Int. Cl.[4] G09B *19/00*
U.S. Cl. 434—191 **11 Claims**



1. A learning aid, comprising:

(a) a main chart having a number of symbols arranged at predetermined positions, one of said symbols being selected from all of the symbols;

(b) a number of question-and-answer, auxiliary charts, each having a different group of said symbols, each symbol on the main chart appearing in at least one of said groups; and

(c) a number of apertured, showing sheets separate from the auxiliary charts and identical in number to the number of auxiliary charts,

(i) each showing sheet being keyed to a respective auxiliary chart and having a size identical to the main chart for superposition thereon in use,

(ii) each showing sheet being independently movable between a first position overlying the main chart in a first direction and an inverted second position overlying the main chart and oriented in a second direction that is 180° away from the first direction.

(iii) each showing sheet having apertures of the same size and arranged in different patterns,

(iv) the apertures of each pattern of a respective showing sheet being located at positions in registry with the positions occupied by a respective group of symbols on the auxiliary chart keyed to the respective showing sheet when the latter is in the first position,

(v) the apertures of each pattern of a respective showing sheet being located at positions out of registry with the positions occupied by a respective group of symbols on the auxiliary chart keyed to the respective showing sheet when the latter is in the second, inverted position,

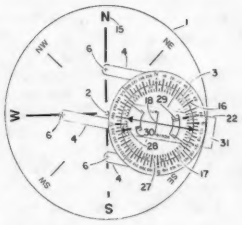
(vi) all of the showing sheets, when superimposed over the main chart, displaying the selected symbol through at least one of the apertures.

4,886,458

MECHANICAL ANALOG COMPUTER DEVICE

Robert J. Roman, 174 New Wickham Dr., Penfield, N.Y. 14526

Filed Jun. 27, 1988, Ser. No. 212,008
Int. Cl.[4] G09B *19/16*
U.S. Cl. 434—243 **24 Claims**



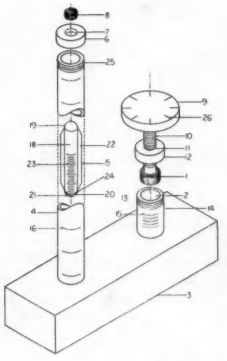
1. A mechanical analog computer device comprising an indicia bearing support member, and an indicia bearing orbital member mounted for non-rotational movement relative to said support member; said orbital member being mounted to said support member by a plurality of link members.

4,886,459

PRECISION CONTROLLED CARTESIAN DIVER

Walter D. Fuller, 14475 Strathmore La,, Apt. 807, Delray Beach, Fla. 33446

Filed Jul. 11, 1988, Ser. No. 217,559
Int. Cl.[4] G09B *23/06*
U.S. Cl. 434—300 **19 Claims**



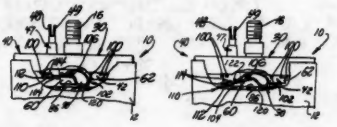
1. A closely fluid containing device comprising an indexed fluid displacement means, a transparent, elongated, indexed vertical guide means freely enclosing a variably buoyant, indexed, pressure sensitive submersible means that transits said vertical guide means reciprocably in response to precisely controlled, measurable, fluid displacement variations, and a base support means that provides support to and transmits pressure and fluid between said indexed fluid displacement means and said elongated, indexed, vertical guide means, said base support means enclosing a portion of the total enclosed fluid.

4,886,460

ELECTRICAL CONNECTOR ASSEMBLY FOR A STEERING WHEEL OCCUPANT CUSHION RESTRAINT SYSTEM

Leland N. Olgren, Frankenmuth, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed Feb. 27, 1989, Ser. No. 315,677
Int. Cl.[4] H01R 35/00
U.S. Cl. 439—15 3 Claims



1. In combination with a motor vehicle steering assembly including a steering column member rotatably supporting a steering shaft drivingly connected with a steering wheel having an occupant restraint cushion, said vehicle having a sensor for causing actuation of said occupant restraint cushion, an electrical connector arrangement interposed between said steering column member and said steering shaft which provides electrical continuity between said restraint cushion and said sensor when the steering shaft and wheel are rotated relative to said steering column member, said electrical connector arrangement comprising an outer stationary housing, an inner housing rotatably supported by said outer housing and which is connected with said steering shaft to be rotatable therewith, a current conductor coil carried by said outer housing and wound a plurality of times around said inner housing, a first electrical connector carried by said stationary housing and electrically connected with said sensor and with said conductor coil at its outer end and a second electrical connector carried by said inner housing and electrically connected with said cushion restraint and said conductor coil at its inner end, said conductor being unwound from and wound tighter toward said inner housing when the steering shaft is rotated in first and second directions, respectively, the improvement comprising:

releasable locking means for automatically locking said inner housing to said outer housing to prevent any significant relative rotation therebetween when said electrical connector arrangement is disconnected from said steering column member and for automatically unlocking said inner housing from said outer housing to allow rotation of said inner housing relative to said outer housing when the electrical connector arrangement is operatively connected with said steering column assembly,

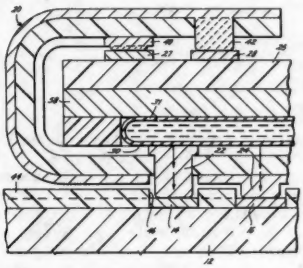
said releasable locking means comprising a plurality of annularly spaced, axially extending protrusions on said outer housing and located adjacent to said inner housing, and a locking member made from spring steel, said locking member having an intermediate portion pivotally connected to said inner housing, a locking end portion overlying said protrusions on said outer housing and a spring portion in the shape of a loop whose free end rides on the intermediate portion along its side facing the inner housing, said spring portion of said locking member engaging said inner housing so that it is self biased to a first position in which its outermost loop portion is located axially spaced from said inner housing and said locking end portion of said locking member is in engagement with said outer housing and engageable with said protrusions, said locking member being pivotally movable from its first position to a second position in which its locking end portion is spaced from said outer housing a distance such that it clears said protrusions in response to said spring being compressed by said steering column and with its free end sliding on said intermediate portion of said locking member in response to the spring engaging a transverse abutment on said steering column when the electrical connector arrangement is being connected to said steering column and shaft.

4,886,461

ZERO INSERTION FORCE ELECTRICAL CONNECTOR

Robert T. Smith, Roundrock, Tex., assignor to Microelectronics and Computer Technology Corporation, Austin, Tex.

Continuation of Ser. No. 95,972, Sep. 14, 1987, abandoned. This application Oct. 17, 1988, Ser. No. 258,930
Claims priority, application United Kingdom, Oct. 11, 1986, 8626827
Int. Cl.[4] H05K 1/00
U.S. Cl. 439—67 3 Claims



1. A zero insertion force electrical connector comprising,

a first electrical substrate having a plurality of first electrical contacts recessed in windows,

a flexible three layer tape having a first metal signal layer, a middle dielectric layer, and a third ground layer, said tape including a plurality of second electrical contacts extending outwardly from a first side for engaging said first electrical contacts, each of said second contacts connected to one of the first and third layers, and electrical connections at the outer edges of said tape connected to the first metal signal layer and to the third ground layer,

an isostatic medium positioned against the second side of the tape,

retaining means holding the isostatic medium in engagement against the second side of the tape,

pressure generating means acting on the isostatic medium for providing a uniform force forcing the first and second contacts in engagement, and

a second electrical substrate electrically connected to the electrical connections on the tape.

4,886,462

CIRCUIT BREAKER PRINTED CIRCUIT BOARD CONNECTOR DEVICE

Joseph Fierro, Trenton, N.J., assignor to Heinemann Electric Company, Lawrenceville, N.J.

Filed Feb. 1, 1988, Ser. No. 150,889
Int. Cl.[4] H01R 9/09
U.S. Cl. 439—79 10 Claims

1. A circuit breaker and printed circuit board connector combination comprising

a connector receptacle provided with enclosing walls having at least one flat side for application to a circuit board;

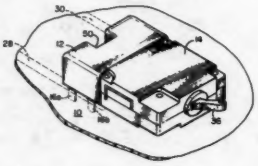
at least a pair of conductive electrical connectors within and supported by the connector receptacle;

pin connectors electrically connected to the respective connectors and mechanically supported by the connector receptacle projecting generally normal to and away from the at least one flat side of the connector receptacle so as to be insertable in receiving openings on the printed circuit board whereby the flat side may be kept parallel to

the printed circuit board and the pin connectors for different connectors may be conductively connected to different conductors of the printed circuit board;

a latch cooperative element on the connector receptacle including a shoulder;

a circuit breaker having electrical connectors arranged to cooperate with the connectors on the connector receptacle by moving the circuit breaker and the connector device together in a generally linear direction transverse to the general plane of the shoulder of the latch cooperative element; and



a latch element extending from the circuit breaker including a shoulder cooperative with the shoulder of the latch cooperative element on the connector device to engage and hold the circuit breaker in the position with the connectors of the breaker and connector receptacle interconnected, such that either the latch element or the latch cooperative element, or both, is deflected transversely of the direction of movement by the movement of the circuit breaker and connector device together and resiliently repositioned to accomplish latching.

4,886,463

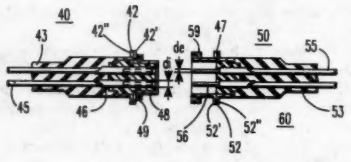
ELECTROMAGNETIC INTERFERENCE CONNECTOR

William T. Scott, Ellicott City, and Robert A. Leishear, Woodlawn, both of Md., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Sep. 21, 1988, Ser. No. 247,223

Int. Cl.[4] H01R *4/58*

U.S. Cl. 439—89 **9 Claims**



1. An improved, multi-shell, electrical connector apparatus having a male shell portion, said male shell portion having at least one pin means, said electrical connector apparatus also having a female shell portion, said female shell portion having at least one pin holder, said male and said female shell portions operable to slideably interfit one another, thereby electrically interconnecting said pin and said pin holder, said interconnected male and said female shell portions having an air gap between said male and said female shell portions, the improvement comprises:

an electromagnetic interference seal means, said electromagnetic interference seal means comprising a flexible, generally annular, conductive member, said electromagnetic interference seal means slideably interfitting and being fixedly connected to said male shell portion or said female shell portion during said electrical connector apparatus operation, said electromagnetic interference seal means diminishing said air gap between said male shell portion and said female shell portion thereby completing an electrical connection between said male shell portion and said female shell portion of said electrical connector apparatus and whereby said diminished air gap and said electrical connection reduces the electromagnetic interference emitted from said electrical connector apparatus and said electromagnetic interference entering said electrical connector apparatus.

4,886,464

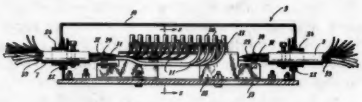
REMOTE INTERCONNECTION BOX UTILIZING SHIELDING INTERCONNECTING BRACKETS

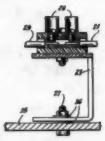
Maurice F. Zetena, Jr., P. O. Box 59, Bridgewater, Conn. 06752

Filed Oct. 24, 1988, Ser. No. 261,580

Int. Cl.[4] H01R *9/24*

U.S. Cl. 439—98 **7 Claims**





1. An interconnection box for use in interconnecting pairs of composite cables, said cables including a plurality of twisted pairs and shielding braid, said box including

a housing having a base therein, at least one electroconductive support bracket mounted on said base within said housing, said bracket being insulated from said base,

pairs of clamping means on said bracket to clamp and electrically interconnect said braid from each of said pairs of composite cables to said bracket thereby electrically interconnecting said braid from each of said pairs of composite cables through said bracket without connecting said braid to said housing, and

a terminal block mounted on said bracket between said pairs of clamping means to interconnect said twisted pairs from one of said pairs of composite cables with said twisted pairs from the other of said pairs of composite cables,

whereby said pairs of composite cables and their braids can be interconnected.

4,886,465

ELECTRICAL OUTLET PROTECTIVE COVER

Mark E. Warner, 810 Davis St., Milton-Freewater, Oreg. 97862

Filed Jun. 9, 1988, Ser. No. 204,610

Int. Cl.[4] H01R *13/44*

U.S. Cl. 439—137 **5 Claims**

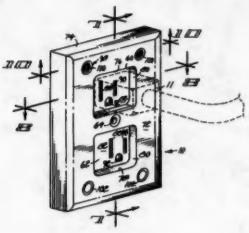
1. An electrical outlet protective cover for preventing one from directly inserting an electrical plug into a receptacle of an electrical outlet on which the cover is mounted, in which the electrical plug has at least two electrical prongs extending a prescribed length from a plug base to prong ends, comprising:

a plate body for mounting to the electrical outlet having (1) a back panel having a back surface adapted to engage a wall surrounding an outlet and further having a receptacle

aperture extending through the back panel for receiving a receptacle therein, (2) a front panel having a front surface spaced outward from the back panel and (3) a plug passageway formed therein extending between the front surface and the receptacle aperture for receiving the electrical plug therein;

a prong shutter mounted to the plate body for transverse sliding movement in the plug passageway between an aligned position and an offset position;

said prong shutter having prong apertures formed therein for receiving the plug prongs to prevent the plug prongs



from being inserted into the receptacle when the shutter is in the offset position and to permit the plug prongs being inserted into the receptacle when the shutter is in the aligned position; and

wherein the plug passageway has a length extending between the front surface and the back surface approximating the length of the plug prongs and providing a barrier at the front surface adjacent to the plug passageway for preventing further insertion of a plug when the shutter is in the offset position; and

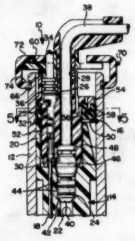
visual indicator means for visually indicating when the prong shutter is in the aligned position.

4,886,466

SEALED ELECTRICAL AND PNEUMATIC CONNECTOR

Paul D. Doherty, Bellbrook; Timothy N. Tackett, and Lawrence R. Gavin, both of Warren, all of Ohio, assignors to General Motors Corporation, Detroit, Mich.

Filed May 26, 1988, Ser. No. 199,247
Int. Cl.[4] H01R 4/64
U.S. Cl. 439—191 **7 Claims**



1. A sealed electrical and pneumatic connector for a hollow piston rod comprising

a first connector body which is retained in the hollow piston rod and which has a plurality of electrical terminals which are arrayed around a central pneumatic passage in the connector body,

a second connector body which is inserted into the hollow piston rod and plugged into the first connector body which is housed in the hollow piston rod,

said second connector body having a plurality of terminal cavities which are arrayed around a central passage,

said second connector body having electrical terminals housed in the terminal cavities which mate with the terminals of the first connector body when one connector body is plugged into the other connector body,

said second connector body having a hose which is disposed in its central passage and which supports sealing means providing seals between the hose and the first connector body and between the hose and the second connector body respectively,

the second connector body carrying an elastomeric seal sleeve which seals between the second connector body and the bore of the hollow piston rod, and

a retainer for retaining the second connector body in the piston rod in mated engagement with the first connector body wherein:

said first connector body has a shroud and a pneumatic passage which is enlarged at the upper end to form a tapered seat and which opens into a cavity of the shroud,

said second connector body has a central passage which has an enlarged lower end which terminates in a tapered seat,

the hose is inserted into the central passage of the second connector body via the enlarged lower end of the central passage,

the hose has a flange at its lower end which has a tapered face which mates with the tapered seat of the first connector body,

the sealing means providing seals between the hose and the first connector body and between the hose and the second connector body comprises a lower elastomeric O-ring seal, an intermediate sleeve and an upper elastomeric O-ring seal which are disposed on the lower end of the hose above the flange, and

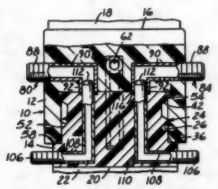
said intermediate sleeve is slideably mounted on the hose and engages the tapered seat of the second connector body to insure that the lower O-ring is positioned properly for sealing engagement with the enlarged upper end of the central pneumatic passage in the first connector body.

4,886,467

QUICK CHANGE TOOL HOLDER

Johnnie E. Peveto, El Paso, Tex., assignor to Chrysler Motors Corporation, Highland Park, Mich.

Filed Jun. 2, 1989, Ser. No. 360,677
Int. Cl.[4] H01R 4/64
U.S. Cl. 439—192 **10 Claims**



6. An improved support device for an end effector which uses pressurized fluid and electricity for power, the support device having two base assemblies, one adapted to be semi-permanently mounted on a machine arm, the other adapted to be semi-permanently mounted to the end effector thereby making removal between the base assemblies and the machine arm and the end effector difficult, the two base assemblies being of the type with means therebetween including matching and closely overlying surfaces to permit readily attachment and detachment together, the improvement comprising: mold formed base assemblies of nonconductive material; each base assembly having a tubular metallic conduit molded therein with an externally exposed open end portion so that pressurized fluid

and electricity can be transmitted to and from the conduits; each conduit also having another end portion opening through the matching surfaces and positioned in aligned relationship with one another when the base assemblies are moved into attached relation; means for providing a good fluid leak resistant and electrical connection between the conduits when the base assemblies are attached.

4,886,468

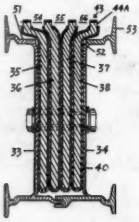
INSULATED ELECTRICAL POWER DISTRIBUTION BUSWAY TABS

Lynn M. Harton; Bruce R. Rosenberger; John D. Anderson, and Clarence W. Walker, all of Selmer, Tenn., assignors to General Electric Company, New York, N.Y.

Continuation of Ser. No. 203,951, Jun. 8, 1988, abandoned. This application Dec. 8, 1988, Ser. No. 281,415

Int. Cl.[4] H01R *25/16*

U.S. Cl. 439—212 **8 Claims**



1. An electric busway system comprising:

a plurality of electrically conductive bars, each of said bars being electrically insulated from each other, and extending parallel to each other;

a pair of metallic side plates, one on each side of said plurality of conductive bars, said pltes providing a housing enclosure to said conductive bars; and

a plurality of tabs, each said tab extending parallel to and being welded or brazed to a respective said conductive bar said tabs being offset from each other to define spaces between adjacent said tabs to facilitate insertion of electrical connection means into said spaces, thereby providing external electrical connection with said tabs.

4,886,469

PLUG WITH ADJUSTABLE PINS

Liang-Chuan Jseng, No. 36, Lane 134, Tong-An Rd., Tainan, Taiwan

Filed Nov. 7, 1988, Ser. No. 268,384

Int. Cl.[4] H01R *13/15*

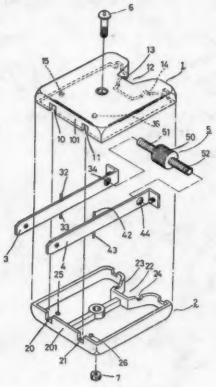
U.S. Cl. 439—265 **2 Claims**

1. A plug with adjustable pins comprising;

a casing of two mating halves having a pair of spaced slots in a front wall, a cave in a rear wall, a pair of opposite circular holes communicating the inside of the casing and the cave, located in wings of the rear wall, a pair of opposite recesses located in the inner surfaces of two opposed main walls close to the slots and two opposite openings properly formed in the main walls;

a pair of pins installed inside the casing with front portions protruded from the slots, both having opposite cylindrical trunnions extending vertically for fitting into the recesses of the casing and two inner-threaded holes transversely formed in the opposite ends;

an adjusting unit having a cylindrical adjusting knob made of electric-insulating material and two concentric end screws with external threads respectively matching with the inner threads of the holes of the pins; and means for securing the halves of the casing in their aligned and mating position through the openings of the casing.



4,886,470

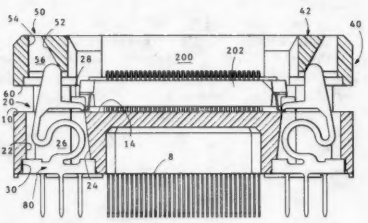
BURN-IN SOCKET FOR GULL WING INTEGRATED CIRCUIT PACKAGE

Timothy B. Billman, King, and Joseph R. Goodman, Walkertown, both of N.C., assignors to AMP Incorporated, Harrisburg, Pa.

Filed May 24, 1988, Ser. No. 198,344

Int. Cl.[4] H01R *13/634*

U.S. Cl. 439—266 **6 Claims**



1. An electrical connector for the electrical interconnection of an integrated circuit package having lead portions extending along side edges thereof, to traces on a printed circuit board, the connector comprising:

an insulative housing member having a lower base portion for mounting on a printed circuit board, the housing having sidewalls upstanding from the lower base portion which forms a nest for the integrated circuit package;

a plurality of electrical terminals having portions extending through the base portion for interconnection to the traces on the printed circuit board and contact portions which are disposed in the nest for interconnection to the integrated circuit package leads;

a lid portion which is disposed adjacent to an open upper face of the housing being movable towards and away from the base portion, the lid portion having a plurality of camming openings extending upwardly from a lower surface of the lid, the downward movement of the lid portion causing a camming surface of the lid portion to

contact the terminals thereby forcing the terminal contact portions outwardly, from a center of the connector base portion, for insertion of the integrated circuit package, each terminal having a camming portion received within a single camming opening in the lid, each camming opening receiving the camming portion of only one terminal, wherein the camming surface is defined as a downwardly and outwardly facing surface within the camming opening, and wherein the camming surface is at an acute angle relative to vertical, and wherein the camming portions are located vertically above the terminal contact portions.

4,886,471

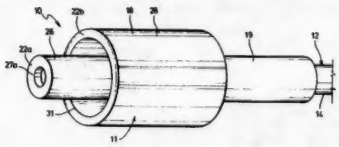
VACUUM SEAL FOR ELECTRICAL CONNECTOR

William D. Fleshman Jr., Elizabethtown, Pa., assignor to AMP Incorporated, Harrisburg, Pa.

Continuation of Ser. No. 8,889, Jan. 30, 1987, abandoned. This application Jan. 27, 1988, Ser. No. 148,192

Int. Cl.[4] H01R *13/40*

U.S. Cl. 439—587 **17 Claims**



1. An electrical plug connector suitable for high voltage, low current applications, and matable with a receptacle connector of relatively rigid material, the receptacle connector being of the type which includes a tubular-shaped outer wall having inner and outer right cylindrical surfaces of fixed inner and outer diameters and an annular edge mating surface, an elongated central cavity, and an electrical contact extending into the central cavity from the base of the receptacle connector, said plug connector comprising:

an integral connector body formed of an elastomeric, dielectric material, said connector body including:

a main body portion;

an elongated inner central body portion extending axially forwardly from said main body portion to a forward end, and

a tubular-shaped, outer body portion extending forwardly from said main body portion radially spaced from and coaxially extending along at least a substantial length of said central body portion, said inner and outer body portions defining an annular cavity therebetween extending axially forwardly from a cavity inner end at said main body portion for receiving the tubular-shaped outer wall of the receptacle connector when the plug and receptacle connectors are mated;

said outer body portion having a right cylindrical smooth inner surface along said annular cavity having an inner diameter selected to be less than the fixed outer diameter of the annular wall of the receptacle connector and necessitating radially outward bulk deformation by the annular wall during mating of the connectors, defining a broad outer band of air-free elastic sealing engagement between said smooth outer body portion inner surface and the annular wall outer surface upon full mating; and

said inner body portion having a substantially right cylindrical smooth outer surface along said annular cavity having an outer diameter selected to be just greater than the fixed inner diameter of the annular wall of the receptacle connector and necessitating radially inward bulk deformation by the annular wall during mating of the connectors, defining a broad inner band of air-free elastic sealing engagement between said smooth inner body portion outer surface and the annular wall inner surface upon full mating, whereby

upon axial movement of said connectors together and positioning of the edge mating surface at said cavity inner end, said inner body portion is compressed and said outer body portion is expanded forming an interference fit of said elastomeric plug connector body with said tubular-shaped outer wall of said receptacle connector substantially along the smooth walls of the entire annular cavity, to displace substantially all air from said annular cavity and establish a vacuum resistance to unmating within said annular cavity for retaining said connectors in mated condition without other latching or fastening means and for providing an electrical seal along adjacent connector surfaces at the interface between said mated connectors defining an interface essentially air-free and highly resistant to voltage leakage, while enabling deliberate unmating upon the application of sufficient axially applied unmating force.

4,886,472

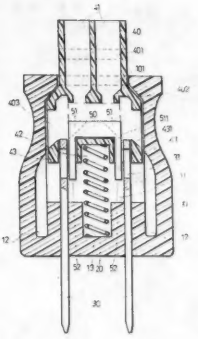
PUSH-TYPE WIRE TERMINATING APPARATUS

Jing-Hwang Tsai, No. 25, Lane 729, Chung-Cheng S. Road, Yung-Kang Hsiang, Tainan Hsien, Taiwan

Filed Jul. 8, 1988, Ser. No. 217,003

Int. Cl.[4] H01R *13/06*

U.S. Cl. 439—656 **3 Claims**



1. An improved push-type wire terminating apparatus having an outer casing formed with an upper flange, a plurality of wire grooves, a first recess in a middle portion thereof with a resilient element disposed therein, an upper hollow section with a plurality of metal conductors fixed therein, a pressing member formed with wire passages, wire-bending points, an open section and a second recess thereof movably disposed in the upper hollow section of the outer casing, comprising:

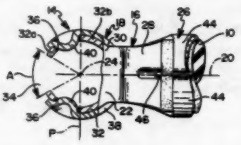
a U-shaped sliding means having a plurality of oblique guide channels separately provided in an upper portion thereof movably installed in the open section of the pressing member in an inverse position over the second recess thereof;

such that when the pressing member is pressed down for wire termination operations, the wire passages of the pressing member and said oblique guide channels of said sliding means will be respectively aligned with the wire guide openings of the metal conductors and the wire grooves of the outer casing.

4,886,473
IGNITION TERMINAL ASSEMBLY

Kenneth B. Germ, Niles, Ohio, assignor to General Motors Corporation, Detroit, Mich.

Filed Jan. 13, 1989, Ser. No. 296,562
Int. Cl.[4] H01R *13/52*
U.S. Cl. 439—847 3 Claims



1. An ignition terminal assembly for attachment to an ignition cable comprising:

an elongated terminal having a longitudinal centerline and a C-shaped retention clip,

the elongated terminal having a forward contact cup which has a centerline which is transverse to the longitudinal centerline of the elongated terminal; a rearward crimp barrel which is parallel to the longitudinal centerline of the elongated terminal; and an intermediate wall which joins the forward contact cup to the rearward crimp barrel,

the contact cup having a top wall and a cylindrical side wall which has a forward half and a rearward half,

the forward half of the cylindrical side wall having a wide gap at the front end of the contact cup which allows the ignition terminal assembly to be disconnected from a mating terminal at a substantial angle without distorting and damaging the ignition terminal assembly and a pair of opposed apertures on either side of the wide gap,

the C-shaped retention clip having a circumferential wall which defines a gap and a pair of dimples at the respective ends of the circumferential wall adjacent the gap, and

the C-shaped retention clip being mounted on the contact cup so that pair of dimples project into the interior of the contact cup through the pair of apertures and the C-shaped retention clip embraces the rearward half of the cylindrical side wall of the contact cup so that the C-shaped retention clip does not interfere with the ignition terminal assembly being disconnected at a substantial angle.

4,886,474
SPINDLE-RECEIVING JACK FOR FORMING AN ELECTRICAL CONNECTION AND ELECTRICAL CONNECTOR COMPRISING AT LEAST ONE SUCH JACK

Pierre L. M. Drogo, 45570 Ouzouer Sur, Loire, France

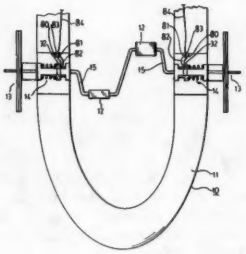
Filed Aug. 4, 1988, Ser. No. 228,125
Claims priority, application France, Aug. 14, 1987, 87 11596
Int. Cl.[4] H01R *11/22*
U.S. Cl. 439—856 2 Claims

1. A spindle-receiving jack for forming an electrical connection through which high speed information signals flow, comprising: three resilient tongues defining a central opening for receiving a stem of a spindle which is forcibly introduced therein, wherein said resilient tongues are coaxially distributed around a longitudinal axis of the jack and define arcs of a circle, each arc inscribed with an angle at the center of the axis, each angle having a different value, each resilient tongue having its own reasonance frequency defined by its respective angle, the jack maintaining said electrical connection through two of the resilient tongues in electrical contact with the stem of said spindle when the electrical connection is subjected to an external vibration, the frequency of which corresponds to the resonance frequency of the third resilient tongue, whereby said electrical connection is not subjected to micro-cutoffs.

4,886,475
STEERING APPARATUS FOR AN INFLATABLE RAFT

Cheng C. Wang, 12 Fl., No. 440, Jen-Ai Rd., Sec. 4, Taipei, Taiwan

Filed Aug. 22, 1988, Ser. No. 234,883
Int. Cl.[4] B63H *16/20*
U.S. Cl. 440—27 9 Claims



1. A steering apparatus for an inflatable raft having a raft body made of a gas-impervious sheet material, a pair of pedals to be manipulated by a user, a pair of impeller assemblies provided at lateral sides of the raft and a power transfer means connected between said pedals and said impeller assemblies; said latter means comprising:

a transmission means including a substantially disc-shaped transmission member, said transmission member having a transmission shaft formed on one surface thereof and protruding therefrom, said shaft being positioned at the central portion of said transmission member and having a sectional plane containing at least one straight side, said transmission member being connected to said pedals;

a driving means;

a coupling means positioned between and movably sleeved onto said transmission shaft and said driving means;

a bias spring disposed between said coupling means and one of said driving means and said transmission means for biasing said coupling means in an engaged position with said transmission means and said driving means; and

an actuating means attached to said coupling means for causing said coupling means to move from said engaged position to a disengaged position for disengaging said transmission means from said driving means;

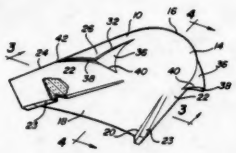
whereby said transmission means can be disengaged from said driving means through the actuation of said actuating means to move said coupling means, thus stopping the impellers which are connected to the disengaged driving means from turning and obtaining an adjustment of the moving direction of the raft.

4,886,476

BODY SURFING BOARD

Eric J. Brocone, 817 Oliver, Pacific Beach, Calif. 92103, and Dennis L. Miller, 1208 E. 12 Mile Rd., Royal Oak, Mich. 48073

Filed Aug. 8, 1988, Ser. No. 229,247
Int. Cl.[4] A63C *15/00*
U.S. Cl. 441—65 20 Claims



1. A body surfing board for riding water waves, the board being a rigid buoyant body comprising a nose portion at the forward end of the body, a bottom portion extending rearwardly from the nose portion, a pair of planar longitudinally extending and downwardly projecting base control fins formed on said bottom portion, said base control fins each having a lateral surface facing each other, a pair of sidewalls each extending rearwardly from the nose portion and upwardly from one of the base control fins, said sidewalls each having an upper edge, a pair of sidewall control fins each formed at the upper edge of its associated sidewall, a top surface extending rearwardly from the nose portion between the upper edges of the sidewalls, said top surface defining a torsoreceiving region behind the nose portion and between the sidewalls, said sidewall control fins and base control fins together facilitating steering said body surfing board.

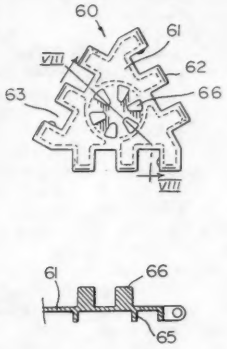
4,886,477

CONNECTBLE POLYGONAL CONSTRUCTION MODULES

James T. Ziegler, Calgary, Canada, assignor to Novation Design Ltd., Ontario, Canada

Continuation of Ser. No. 158,467, Feb. 22, 1988, which is a continuation of Ser. No. 908,919, Sep. 19, 1986, Pat. No. 4,731,041, which is a continuation-in-part of Ser. No. 698,698, Feb. 5, 1985, abandoned, which is a continuation-in-part of Ser. No. 512,638, Jul. 11, 1983, abandoned. This application Jun. 7, 1988, Ser. No. 203,296
Claims priority, application Canada, Mar. 30, 1983, 424896
The portion of the term of this patent subsequent to Mar. 15, 2005, has been disclaimed.
Int. Cl.[4] A63H *33/08*
U.S. Cl. 446—104 12 Claims

1. A polygonal construction module comprising a body portion having edge faces, a top face and a bottom face, each said edge face having a plurality of substantially identical outwardly projecting fingers with gaps therebetween, said fingers being arranged to provide a snap-together lateral interlock between fingers of adjacent modules while providing hinging action between modules on an axis parallel to said edge face, and at least one annular connector element projecting perpendicularly from the body portion top face for establishing a friction fit with a like connector element in face-to-face interlocking engagement, said connector element comprising a series of projections arranged in a uniform circular array, each projection being segmental in shape with radial side walls and the space between each pair of projections being the same shape and size as each projection whereby to receive a projection of said like connector element when engaged therewith, the engaging projections being held in interlocking engagement solely by frictional contact between engaging projection side walls, and the body portion directly beneath each connector element being thin relative to the height and width of each projection to thereby provide said array as a whole with substantially greater flexibility than the intrinsic flexibility of each projection thereby to accommodate dimensional inaccuracies



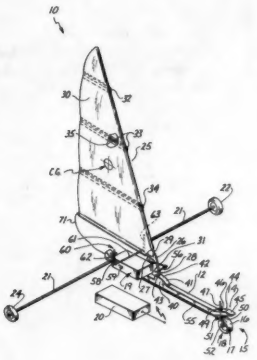
of the projections when engaged with a said like connector element and enhance the firmness of frictional contact between engaging radial side walls.

4,886,478

WIND PROPELLED SAIL TOY VEHICLE

Daniel R. Jones, 1428 Peach Ave., #6, El Cajon, Calif. 92021

Filed Sep. 19, 1988, Ser. No. 246,431
Int. Cl.[4] A63H *29/10, 23/04, 30/00*
U.S. Cl. 446—176 7 Claims



1. A remotely controlled wind propelled land vehicle comprising:

a rod-like frame;

elongated rear axle section means, having two free ends;

a single pair of wheels rotatably mounted to the free ends of said rear axle section;

axle mounting means for connection said rear axle section to one end of said frame and to maintain said single pair of wheels in substantial contact with the ground as the vehicle rollably moves along the ground;

said rear axle section means extending laterally from said frame with said free ends being disposed on opposite sides of said frame;

means disposed at the opposite end of said frame member for mounting a forward axle assembly to said frame member, said forward axle assembly having a single wheel rotatably mounted thereto to enable said single wheel and said

single pair of wheels to support said vehicle solely for rollable movement along the ground;

steering means mounted to said frame for turning said forward wheel, said steering means being responsive to remote control signals;

mast means for supporting an upright sail assembly, said mast means being swingably mounted to said frame for controlled lateral swinging movement thereof, said mast means disposed centrally of said frame member and projecting upward and inclined rearwardly therefrom to align said sail assembly substantially perpendicularly to said rear axle section when said sail assembly is disposed parallel to said frame member;

said frame member being dimensioned along its longitudinal axis to be substantially the same length as said rear axle section;

means for positioning said mast means with the center of gravity thereof being disposed substantially above said rear axle section means when the mast means is aligned with the frame member; and

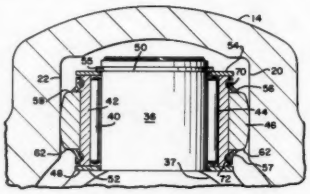
restraining means for limiting the free lateral swinging movement of said mast means to maintain the center of gravity of said sail assembly disposed substantially directly above the rear axle section while the vehicle is propelled along the ground as the mast means swings side to side.

4,886,479

UNIVERSAL JOINT INCLUDING ROLLER BEARINGS

Robert D. Richtmeyer, Goshen, and Kelvin M. Smith, Winsted, both of Conn., assignors to The Torrington Company, Torrington, Conn.

Filed Sep. 12, 1988, Ser. No. 242,583
Int. Cl.[4] F16D *3/20*
U.S. Cl. 464—111 **5 Claims**



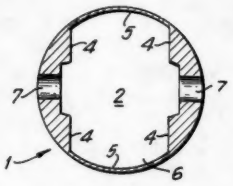
1. A universal joint having a housing provided with a plurality of circumferentially spaced pairs of parallel flat raceways, a rotatable shaft; circumferentially spaced bearing supports on the shaft, each bearing support extending radially from the shaft to between a pair of circumferentially spaced pairs of said housing raceways, a bearing on each bearing support, each bearing comprising: a plurality of rollers around the bearing support; a cylindrical sleeve mounted about the plurality of rollers, the inner surface of the sleeve providing the outer raceway for said rollers; a single roller having a cylindrical inner surface slidably mounted on said sleeve and running between and able to contact either of a spaced pair of said housing raceways, said plurality of rollers and sleeve being rotatable about the bearing support and located axially on the bearing support, said single roller being rotatable about the bearing support and slidable axially on the sleeve.

4,886,480

PRELOADED DRIVE ASSEMBLY

Christian Lutz, Nüziders, Austria, assignor to Etablissement Supervis, Vaduz, Austria

Filed Apr. 20, 1988, Ser. No. 183,723
Claims priority, application Austria, Feb. 12, 1988, 324/88
Int. Cl.[4] F16D *3/16*
U.S. Cl. 464—112 **12 Claims**



1. A joint for transmitting torque comprising a generally tulip-shaped first coupling member having a first recess therein with an opening into the first recess, and intermediate member pivotally mounted within the first recess in said first coupling part, a second coupling member pivotally mounted within a second recess located within said intermediate member, first means for connecting said first coupling part with said intermediate member, second means for connecting said second coupling member and said intermediate member, said second coupling member comprises an axially elongated shank and a joint pin at one end of said shank having an elongated axial dimension extending transversely of the axis of said shank and located within the second recess in said intermediate member, said joint pin having a uniform diameter, said first connecting means comprises axially extending pivot pins disposed in axial alignment on opposite sides of the axis of said joint pin and pivotally interconnecting said first coupling member and said intermediate member, the axes of said pivot pins intersect at right angles with the axis of said joint pin, said first coupling member and said intermediate member having flat surfaces in the region where said pivot pins interconnect said first coupling member and said intermediate member includes generally symmetrical shell halves having facing contacting surfaces forming a separation plane of said shell halves with said axis of said joint pin located at least one of within and immediately adjacent to said separation separation plane is located at right angles to the aligned axes of said pivot pins, and said second connecting means includes a spring member in engagement with said irate member and opposite ends of said joint pin extending transversely of the axis thereof for interconnecting said intermediate part and said second coupling member and for applying a play compensating spring force to said joint pin.

4,886,481

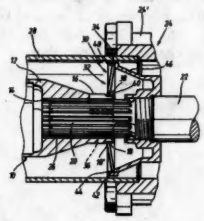
TENSIONING DEVICE FOR MAINTAINING TWO SHAFT SECTIONS IN PLAYFREE ENGAGEMENT IN THE DIRECTION OF ROTATION

Siegfried Gutfleisch, Bisingen; Gerhard Hopsch, Obersulm, and Einhard Kleinschmit, Esslingen, all of Fed. Rep. of Germany, assignors to Daimler-Benz Aktiengesellschaft, Stuttgart, Fed. Rep. of Germany

Filed Aug. 29, 1988, Ser. No. 237,319
Claims priority, application Fed. Rep. of Germany, Sep. 3, 1987, 3729393
Int. Cl.[4] F16D *1/10, 3/06*
U.S. Cl. 464—162 **8 Claims**

1. A coupling device to maintain two shaft sections in driving engagement without play in the direction of rotation, said two shaft sections being mutually connected with longitudinal sliding mobility therebetween by means of cooperating splined shaft profiles thereon, one shaft section having the shaft profile internal thereof and the other external thereof, a tensioning

means provided in a free end region of a hublike shaft section of the one shaft section adjacent its internal shaft profile, said tensioning means being retained on the hublike shaft section, wherein the hublike shaft section is slitted tongs fashion at its free end region, wherein the tensioning means comprises at least one slightly tapered annular spring arranged on the end region of the hublike shaft section which is slitted, and wherein the tensioning means comprises a stop on the other shaft section against which the annular spring is pressable at an outer



edge part in the course of bringing the two shaft sections into axial and mutual engagement in order to generate a radial tensioning force to cause the slitted end tongs to urge the internal shaft profile of the one shaft section against the external shaft profile of the other shaft section so that the two shaft sections will rotate in unison without rotational play and while allowing the two shaft profiles to be slid in said longitudinal direction to permit longitudinal mobility between said two shaft sections.

4,886,482

NOVEL TENSIONING DEVICE

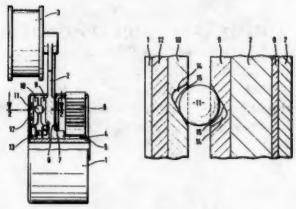
Hartmut Koschmieder, and Werner Petri, both of Erlangen, Fed. Rep. of Germany, assignors to INA Walzlager Schaeffler KG, Fed. Rep. of Germany

Filed May 25, 1989, Ser. No. 357,424

Claims priority, application Fed. Rep. of Germany, Jul. 20, 1988, 3824645

Int. Cl.[4] F16H 7/12

U.S. Cl. 474—133 **12 Claims**



1. Tensioning device, particularly a belt tensioning device, for the drive of auxiliary aggregates of an internal combustion engine comprising a swivel arm at one end of which a tension roller for the belt is rotatably mounted and whose other end is plugged by means of a hub onto a journal which is parallel to the axis of rotation of the tension roller and arranged in a fixed pot-shaped housing, a spring whose one end is fixed to the swivel arm and whose other end is fixed to the housing and, arranged in the housing, a friction damping means which produces damping forces of differing magnitude for the swivel arm in the two directions of movement and has a friction lining lying against the housing wall and acted upon by the swivel arm, characterized in that the friction damping means comprises an inner ring fixed to the swivel arm, an outer ring lying against the friction lining and several rolling elements arranged between these rings and disposed in troughs in the rings for rolling movement along ramps.

4,886,483

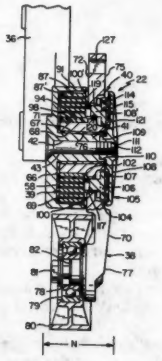
BELT TENSIONER AND METHOD OF MAKING THE SAME

Dewey D. Henderson, Springfield, Mo., assignor to Dayco Products, Inc., Dayton, Ohio

Filed Nov. 23, 1988, Ser. No. 276,084

Int. Cl.[4] F16H 7/12

U.S. Cl. 474—135 **20 Claims**



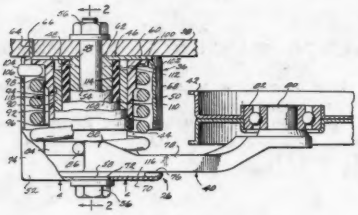
1. In a tensioner for a power transmission belt that is adapted to be operated in an endless path, said tensioner comprising a support means for being fixed relative to said belt, a belt engaging means carried by said support means and being movable relative thereto, first spring means operatively associated with said support means and said belt engaging means for urging said belt engaging means relative to said support means and against said belt with a force to tension said belt, and frictional dampening means operatively associated with said support means and said belt engaging means to dampen the movement of said belt engaging means relative to said support means in at least one direction of movement thereof, said dampening means having a longitudinal axis, said support means comprising a shaft means having a longitudinal axis and being fixed from movement relative to said belt engaging means, said belt engaging means having a portion thereof being rotatably carried by said shaft means so as to rotate relative to said shaft means, said dampening means comprising a pair of frictionally engaging first and second parts with said first part comprising an annular pad of friction material that is coaxially disposed and axially movable on said shaft means relative to said second part, and second spring means urging said first part against said second part with a certain spring force, said tensioner having an antifriction annular disc-like member disposed on said shaft means between said first spring means and one of said support means and said belt engaging means, said first part of said dampening means having guide means thereon, said one of said support means and said belt engaging means having opening means therein that receive said guide means therein to guide axial movement of said first part, said tensioner having bearing means disposed in said opening means and receiving said guide means therein, the improvement wherein said antifriction disc-like member carries said bearing means on one side thereof.

4,886,484

TORSIONAL SPRING TENSIONER WITH STABILIZER

David A. Hanes, Holland Landing, Canada, assignor to Litens Automotive Partnership, Woodbridge, Canada

Filed Jun. 2, 1989, Ser. No. 360,302
Int. Cl.[4] F16H 7/12
U.S. Cl. 474—135 6 Claims



1. A belt tensioner suitable for use with an automotive serpentine belt system comprising

a fixed structure adapted to be mounted on an automotive engine,

a pivoted structure mounted on said pivoted structure for pivotal movement about a pivotal axis between an installation position and a maximum extension position,

a torsional metal spring operatively connected between said fixed structure and said pivoted structure for resiliently biasing said pivoted structure toward said maximum extension position,

a belt engaging pulley rotatably mounted on said pivoted structure for rotational movement about a rotational axis spaced from said pivotal axis,

said torsional metal spring being in the form of a helical coil having opposite end portions connected with said fixed and pivoted structures respectively with a major portion of the helical coil formation between said opposite end portions being disposed in spaced relation with said fixed and pivoted structures,

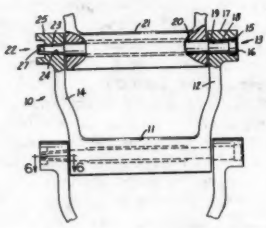
and spring stabilizing means mounted within the interior of the major portion of the coil formation and out of contact with said fixed and pivoted structures for altering the natural frequency of said torsional spring and damping the effects of torsional inertia imposed on said spring by the pivotal movements of said pivoted structure.

4,886,485

TAPER-LOC DRAG LINK AND PIN

A. J. Bartoletto, 1975 Tuckaway Dr., Bloomfield Hills, Mich. 48013

Filed Feb. 10, 1989, Ser. No. 308,462
Int. Cl.[4] F16G 13/06
U.S. Cl. 474—219 6 Claims



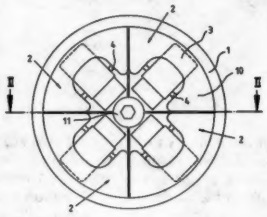
1. Drag chain link and pin assembly comprising bifurcated link with integral arms extending from apertured barrel, said arms having end bosses spanning the barrel of an adjacent link with barrel-aligned connecting pin apertures characterized by connecting pin means positively secured against rotation in said bosses, and tight fit arm boss and connecting pin means for excluding entrance of abrasive material.

4,886,486

CENTRIFUGE EQUIPPED WITH A ROTOR

Ekkehard Grimm, Offenbach, and Eckhard Tödteberg, Osterode, both of Fed. Rep. of Germany, assignors to Heraeus Sepatech GmbH, Osterode, Fed. Rep. of Germany

Filed Jan. 12, 1989, Ser. No. 296,221
Claims priority, application Fed. Rep. of Germany, Feb. 4, 1988, 3803255
Int. Cl.[4] B04B 5/02
U.S. Cl. 494—20 10 Claims



1. Centrifuge comprising:

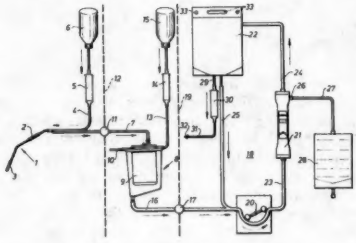
a rotor having a shaft and having sector-shaped inserts secured in position in the rotor in the direction of the rotor shaft, two pivots being associated with each sector-shaped insert, a plurality of buckets hung each on the two pivots, the inserts having radially disposed supporting walls aligned substantially vertically which receive a thrust of the pivots and the rotor having a radially outer area which serves as a supporting surface in the operating state, one of the pivots being disposed on each of two supporting walls of the insert which receive bearing forces, the free ends of the pivots facing one another.

4,886,487

AUTOTRANSFUSION APPARATUS

Jan O. Solem, Bjarred, and Olev Pilman, Lund, both of Sweden, assignors to Gambro AB, Sweden

Filed Nov. 18, 1986, Ser. No. 932,173
Claims priority, application Sweden, Nov. 18, 1985, 8505438
Int. Cl.[4] A61M 37/00
U.S. Cl. 604—5 19 Claims



1. An autotransfusion apparatus for employing a patient's blood as a source for providing a transfusion, comprising:

collecting means for collecting said patient's blood;

treatment means for treating blood collected in said collection means, said treatment means comprising a blood recirculation circuit coupled to said collecting means for receiving blood from said collecting means and conducting blood through said recirculation circuit, said recirculation circuit including filter means for filtering blood being conducted therethrough so as to separate a filtrate from said blood and remove undesired portions thereof and a blood retention vessel for receiving blood treated in said filter means, said filter means including a blood inlet, a blood outlet, and a filtrate outlet, and said blood retention vessel including an inlet and an outlet, and said recirculation circuit further including conduit means connecting said blood outlet of said filter means to said inlet of said retention vessel and connecting said outlet of said blood retention vessel to said blood inlet of said filter means so that blood in said blood retention vessel may be conducted through said filter means for further treatment and then returned to said blood retention vessel; and

return means separate from said collecting means and coupled to said blood retention vessel for returning blood from said blood retention vessel to said patient, so that said apparatus is capable of functioning continuously to withdraw, filter and return said patient's blood.

4,886,488

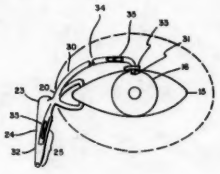
GLAUCOMA DRAINAGE THE LACRIMAL SYSTEM AND METHOD

Thomas C. White, 1127 Holly Dr., Sioux Falls, S. Dak. 57105

Continuation of Ser. No. 82,837, Aug. 6, 1987, abandoned. This application Aug. 4, 1988, Ser. No. 229,746

Int. Cl.[4] A61M *1/00*

U.S. Cl. 604—9 **9 Claims**



3. An ocular device for glaucoma treatment comprising a flexible tube having inlet and outlet ends, shaped to be inserted into the anterior chamber of an eye and the conjunctival culde-sac of the eye, respectively, and a one-way valve positioned within the tube between the inlet and outlet ends to allow fluid flow only toward the outlet end.

4,886,489

FLOW-THROUGH METHODS AND APPARATUS FOR IONTOPHORESIS APPLICATION OF MEDICAMENTS AT A CONTROLLED PH

Stephen C. Jacobsen, 274 S. 1220 East, Salt Lake City, Utah 84102; Tomasz J. Petelenz, 623 University Village, and Robert L. Stephen, 2501 Kensington Ave., both of Salt Lake City, Utah 84108

Continuation-in-part of Ser. No. 841,329, Mar. 19, 1986, Pat. No. 4,752,285. This application Jun. 19, 1987, Ser. No. 64,813

Int. Cl.[4] A61N *1/30*

U.S. Cl. 604—20 **11 Claims**

1. A method for iontophoretically administering a medicament through the skin of a patient while removing competing ions produced within the iontophoresis system by the electrolysis of water, the method comprising the steps of:

(a) obtaining a first electrode and a second electrode;

(b) obtaining a medium containing a medicament;

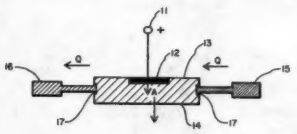
(c) placing the first electrode in communication with the medium;

(d) placing the medium in communication with the skin of the patient such that the medium is disposed between the first electrode and the skin of the patient;

(e) placing the second electrode in communication with the skin of the patient at a point distal from the first electrode;

(f) creating a voltage differential between the first and second electrodes such that the medicament is driven into the skin of a patient; and

(g) simultaneously flowing fresh quantities of the medium containing medicament between the first electrode and



the skin of the patient and removing quantities of the medium from between the first electrode and the skin of the patient which contain products of the electrolysis reaction of water while the voltage differential between the first and second electrodes exists, thereby iontophoretically administering a medicament through the skin of the patient while removing competing ions produced within the iontophoresis system by the electrolysis of water.

4,886,490

ATHERECTOMY CATHETER SYSTEM AND METHOD OF USING THE SAME

Samuel Shiber, Mundelein, Ill., assignor to Surgical Systems & Instruments, Inc., Mundelein, Ill.

Continuation-in-part of Ser. No. 078,042, Jul. 27, 1987, Ser. No. 205,479, Jun. 13, 1988, and Ser. No. 225,880, Jul. 29, 1988, each is a continuation-in-part of Ser. No. 874,546, Jun. 16, 1986, Pat. No. 4,732,154, which is a continuation-in-part of Ser. No. 609,846, May 14, 1984, abandoned. This application Sep. 13, 1988, Ser. No. 243,900

Int. Cl.[4] A61B *17/32*

U.S. Cl. 604—22 **28 Claims**

1. An atherectomy system for coring, ingesting and removing an obstruction from within a patient's vessel, comprising in combination:

a flexible guide-wire insertable into the vessel,

a flexible rotary catheter, rotatably disposed and insertable into the vessel over said flexible guide-wire, having at its distal end a rotary coring means for making a circular cut in an obstruction located in front of it, and coupling means at its proximal end,

a continuous passage, for ingesting the cored obstruction material, defined between said flexible rotary catheter and said flexible guide-wire, where the relative motion between said flexible rotary catheter and said flexible guide-wire assists in moving said ingested obstruction material proximally in said continuous passage, and,

a rotating means having a hollow shaft connected to said proximal end through said coupling means, said hollow shaft being rotatable and slideable over said flexible guide-wire.

4,886,491

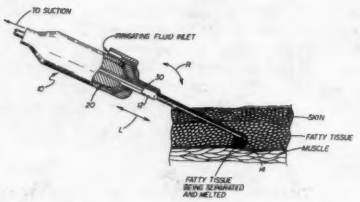
LIPOSUCTION PROCEDURE WITH ULTRASONIC PROBE

Tulio Parisi, 9011 Mesa Woods Ave., San Diego, Calif. 92126, and Richard K. Massengill, 15350 Via Molinero, Poway, Calif. 92064

Filed Feb. 29, 1988, Ser. No. 161,796

Int. Cl.[4] A61B *17/20*

U.S. Cl. 604—22 **7 Claims**



1. A method of removing animal fatty tissue from a patient in vivo comprising the steps of:

inserting an aspirating probe into the body in an area between the flesh and the muscle in the area of the fatty tissue;

ultrasonically vibrating said probe at substantially high frequencies and low amplitudes, creating localized tissue separation and frictional heat;

melting at least some of said fatty tissue by said localized heat, so as to provide more efficient removal of said fatty tissue;

irrigating the area surrounding the probe;

emulsifying said fatty tissue; and

aspirating the emulsified fatty tissue by applying suction, whereby a slimmer profile is provided.

4,886,492

SURGICAL SUCTION TIP WITH FILTER

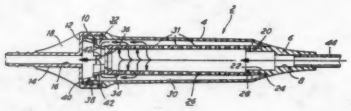
Gerard M. Brooke, The Bannut Tree, New Inn Lane, Avening GL8 8NB, Gloucestershire, England

Filed Mar. 18, 1988, Ser. No. 169,854

Claims priority, application United Kingdom, Mar. 24, 1987, 8706958

Int. Cl.[4] A61M *31/00*

U.S. Cl. 604—49 **4 Claims**



1. A surgical suction tip comprising a tubular body portion having an inner wall surface, a hollow, reduced-diameter tip portion at one end of said body portion and defining therein a bore which communicates into the interior of the body portion, a releasable cap portion closing the other end of the body portion and having an aperture formed therethrough, a tubular connecting portion provided externally of said cap portion into the interior of the body portion and defining therein a bore which communicates through the aperture in the cap into the interior of the body portion, a hollow filter member located within the body portion to define a chamber of generally annular transverse section between the filter member and the inner wall surface of the body portion, the filter member being provided with a plurality of apertures therein interconnecting the interior of the filter member with said annular chamber, and location means integrally formed within the body portion adjacent the tip portion thereof to receive thereon and to locate one end of the filter member within the body portion such that material entering the body portion through the tip portion flows into the hollow interior of the filter member, the other end of the filter member being closed, the annular chamber within the body portion being in communication with the tubular connecting portion by way of said aperture in the cap portion, in which said filter member further comprises a removable end cap located in, to close, the other end of the filter member, said end cap including a tapering annular skirt portion having a free end which is gripped between the other end of the body portion and the cap portion to locate said end cap in an operative position within the body portion, the skirt portion of the end cap defining therein a plurality of apertures which interconnect the annular chamber within the body portion with the tubular connecting portion by way of the aperture in the cap portion.

4,886,493

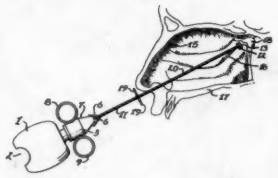
MEDICAL APPLICATOR PROCESS

Jordan Yee, 517 Getzville Rd., Amherst, N.Y. 14226

Filed Oct. 22, 1987, Ser. No. 111,213

Int. Cl.[4] A61M *31/00*

U.S. Cl. 604—54 **8 Claims**



1. A process for accomplishing the Sphenopalatine Ganglion Block in a patient which comprises inserting a flexible tube in an air tight manner to a containing vessel having a measured amount of lidocaine therein and capable of delivering a jet stream spray of its contents, said lidocaine having a concentration of from about 1% to about 20%, inserting said tube into said patient's nose until the frontal terminal portion of said tube reaches the pterygopalatine fossa area, delivering an amount from about 1/16 c.c. to about $\frac{1}{2}$ c.c. of said lidocaine from said containing vessel to said ptyergopalatine fossa area via said tube, maintaining said tube in said patient's nose until said amount of lidocaine is completely delivered in spray form to said area.

4,886,494

MILKING APPARATUS

Yasuo Morifuji, Maison de Colline 106, 7-17, Asahigaoka 1-chome, Ikedashi, Osaka, Japan

Filed Apr. 11, 1988, Ser. No. 179,936

Claims priority, application Japan, Apr. 9, 1987, 62-88524; Dec. 28, 1987, 62-335105

Int. Cl.[4] A61M *1/06*

U.S. Cl. 604—74 **10 Claims**

1. A milking apparatus, comprising:

a bottle for storing drawn out mother's milk;

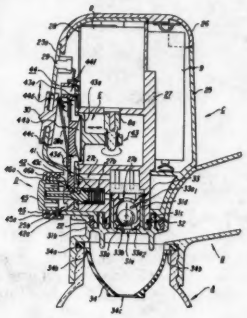
a milking section to be pressed against the mother's breast; and

a suction portion connected vertically with said milking section and said bottle, respectively, including a suction generating section for generating a suction in said bottle, and a pressure adjusting mechanism for adjusting the amount of suction in said bottle;

wherein said suction generating section and said pressure adjusting mechanism include,

(a) an attaching body having an open-air introducing hole in communication with said bottle

(b) a compression coil spring bearing against said attaching body



(c) a valve rod having a tapered surface, said valve rod bearing against said coil spring and being biased away from said attaching body by said coil spring,

(d) a diaphragm having a valve seat for closely contacting, said tapered surface of said valve rod

(e) a cap cooperating with said diaphragm to define a suction chamber therebetween

(f) a pressure releasing push button having an abutment to bear against said valve rod to balance the biasing force of said spring, and a cam surface, and

(g) a pressure adjusting knob for applying a pressing force to said cam surface to move said pressure releasing push button and valve rod against the biasing force of said spring.

4,886,495

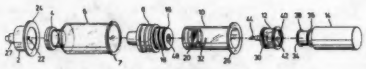
VIAL-BASED PREFILLED SYRINGE SYSTEM FOR ONE OR TWO COMPONENT MEDICAMENTS

David L. Reynolds, Montreal, Canada, assignor to Duoject Medical Systems Inc., Montreal, Canada

Filed Jul. 8, 1987, Ser. No. 72,015

Int. Cl.[4] A61M *5/00*

U.S. Cl. 604—88 **13 Claims**



1. A syringe system comprising, in sequence of assembly from front to rear:

(a) an outer cap defining a hollow interior facing rearwardly, the cap having a forwardly facing attachment for engagement with a hollow needle or other dispensing instrumentality and a rearwardly facing hollow piercing needle within the hollow interior of the cap;

(b) a rearwardly facing annular inner cap which contains an elastomeric closure element and which is capped by the outer cap, the latter including (means) a radially extending flange by which it maybe forced rearwardly relative to the inner cap so that the inwardly facing piercing needle of the outer cap penetrates the inner cap;

(c) a generally cylindrical vial closed at its front end by said elastomeric closure element and open at its rear end, the vial when stood on its rear end being stable against tipping and any external flange at the rear end being too small to cause substantial tipping of the vial when conveyed in a vertical attitude adjacent other similar vials through filling and capping equipment;

(d) a substantially solid elastomeric piston axially movable within the vial and maintaining a first component of a syringe dispensable preparation sealed within said vial between the inner cap and the piston, the piston having a rearward extension within the vial, a comparatively narrow axial passage defined therethrough, and an integral needle penetrable resilient septum closing said passage;

(e) a hollow cylindrical syringe actuating plunger to the rear of the piston, the rearward extension of the piston and the front end of the plunger having coupling means enabling the plunger to be manipulated from a rearward position relative to the piston to a forward position relative to the piston;

(f) a third cap received within and releasably engageable with the interior of the front end of the plunger, the third cap having a double ended hollow needle having both forward and rearward projections, the forward projection of the needle being such that when the cap is engaged with the plunger, and the plunger is in its rearward position relative to the piston, the needle does not penetrate the septum of the piston and when the plunger is in its forward position relative to the piston the needle does penetrate the septum of the piston; and

(g) a sealed collapsible capsule containing a second, liquid component of the preparation, the capsule having a front portion entering the rear end of the plunger and engaging the third cap, and a deformable rear portion extending rearwardly of the plunger whereby the rear portion may be manipulated to drive the forward portion of the capsule onto the rearward projection of the needle and permit the contents of the capsule to be discharged through the needle.

4,886,496

BRONCHOSCOPIC BALLOON TIPPED CATHETER AND METHOD OF MAKING THE SAME

Craig S. Conoscenti, 17 Fawn Ridge La., Wilton, Conn. 06897; Robert A. Gandi, 299 W. 12th St., New York, N.Y. 10014; Gianfranco U. Meduri, 2 Butternut Pl., Wilton, Conn. 06897, and David S. Ostrowski, R.R. 1, Box 851, N. Grosvenordale, Conn. 06255

Filed Feb. 4, 1988, Ser. No. 152,318

Int. Cl.[4] A61M *29/00*

U.S. Cl. 604—96 **2 Claims**

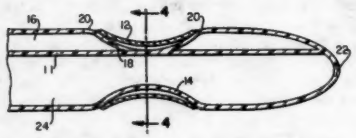
1. A flexible balloon tipped catheter designed to minimize trauma to the balloon when inserted into a channel of a flexible endoscope which, in use, assumes intricate convoluted configurations, comprising:

a catheter tube having a distal end and at least one lumen;

a concave recessed section formed on the exterior surface of said catheter tube located at said distal end;

an inflatable elastomeric balloon material adhered under tension within said recessed section such that said balloon material remains in said recess and follows the concavity

of said recess when said catheter proceeds through said convoluted configurations of the channel, thus preventing mechanical trauma to said balloon material from contact



between said balloon material and the wall surfaces of said channel;

means for fluid communication between said balloon portion and one of said lumen.

4,886,497

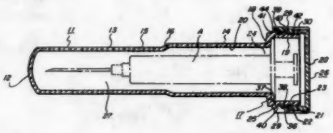
DISPOSABLE PROTECTIVE CONTAINER FOR HYPODERMIC SYRINGES

Charles W. Scholl, Jr., 23412 Via Alondra, Trabuco Canyon, Calif. 92678

Filed Jan. 22, 1988, Ser. No. 146,853

Int. Cl.[4] A61M *5/00*

U.S. Cl. 604—111 **20 Claims**



1. A two piece container having a first, tamper indicative sealed position and a second, locking sealed position comprising:

(a) an elongated hollow body having one sealed end and one open end,

(b) a concave cap adapted to fit over said open end of said elongated hollow body,

(c) frangible fastening means between the inner wall of said cap and the outer wall of said body, said frangible fastening means adapted to hold said cap in a first sealing position relative to said body, and

(d) locking fastening means adapted to hold said cap in a second sealing position after breaking said frangible fastening means.

4,886,498

MECHANISM FOR COUPLING THE ASPIRANT LINE OF AN IRRIGATION/ASPIRATION MACHINE TO THE PRESSURE MONITORING SECTION

Walter A. Newton, Lenoir, N.C., assignor to Entravision, Inc., Lenoir, N.C.

Continuation of Ser. No. 923,277, Oct. 27, 1986, Pat. No. 4,714,464. This application Oct. 19, 1987, Ser. No. 109,755

The portion of the term of this patent subsequent to Dec. 22, 2004, has been disclaimed.

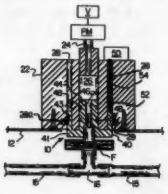
Int. Cl.[4] A61M *5/00*

U.S. Cl. 604—118 **6 Claims**

1. A safety coupling plug for connecting an aspirant line to a receptacle on the face of an irrigation/aspiration machine of the type which includes a peristaltic pump producing a vacuum in an aspirant line and which machine includes a vacuum monitoring section for sampling the pressure in said aspirant line, and further in which said receptacle includes a relatively large central opening through which air samples pass on their way to the machine, at least one additional relatively small channel for receiving a locking prong, and an arming switch for activating said peristaltic pump upon insertion of said safety coupling, said safety coupling plug comprising:

(a) a body member having a central projection extending therefrom for insertion into said central opening in said receptacle;

(b) said body including a central air passageway through said projection registrable with the central opening in said



receptacle for delivery of air from said aspirant line to said pressure monitoring section;

(c) at least one prong member attached to said body member and extending in parallel relationship with said central projection for insertion into said relatively small channel, and locking means associated with said prong member for preventing inadvertent removal of said safety coupling; and

(d) means for activating said arming switch.

4,886,499

PORTABLE INJECTION APPLIANCE

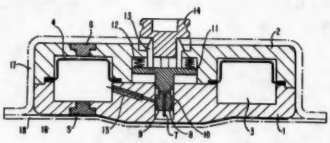
Giorgio Cirelli, Nussbaumen; Hans Steffen, Liestal, both of Switzerland, and Christian Surber, San Francisco, Calif., assignors to Hoffmann-La Roche Inc., Nutley, N.J.

Filed Dec. 4, 1987, Ser. No. 129,018

Claims priority, application Switzerland, Dec. 18, 1986, 5021/86

Int. Cl.[4] A61M *5/14*

U.S. Cl. 604—131 **37 Claims**



1. A portable appliance for subcutaneous or intradermal injection of a liquid formulation of an active principle into a patient comprising:

a housing having a patient engaging surface to contact a patient's skin;

a supply vessel positioned within said housing for storing the liquid formulation;

infusion needle means having an infusion needle and positioned in said housing, said means used for establishing communication between said supply vessel and said infusion needle when said infusion needle is activated to advance into the patient's skin a preselected distance;

pump means for emptying the liquid formulation from said supply vessel through said infusion needle means;

needle driving means for subcutaneous or intradermal injection of the infusion needle through the patient engaging surface and into the patient's skin through an injection site the preselected distance; and

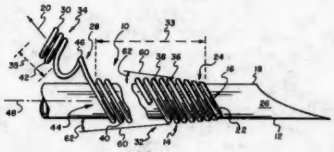
securing means for securing the patient engaging surface of the appliance to a portion of the patient's skin substantially surrounding the injection site through which the infusion needle enters the patient's skin thereby providing a tight adherence of the patient engaging surface to the patient's skin.

4,886,500

EXTERNAL GUIDE WIRE

Harrison M. Lazarus, 853 13th Ave., Salt Lake City, Utah 84103

Filed Nov. 7, 1988, Ser. No. 270,661
Int. Cl.[4] A61M *5/00, 25/00*
U.S. Cl. 604—164 **12 Claims**



1. A guide wire for use with a needle-like device having structure with a tip and a hub to penetrate a patient, said guide wire comprising:

a body having a lumen sized and shaped to slidably and snugly adapt about the structure of a needle-like device to extend from a distal end proximate the tip of said structure to a proximal end outside the body of a patient with said structure positioned into said patient;

a tip formed at the distal end of said body sized and shaped to fair toward the exterior surface of said structure; and

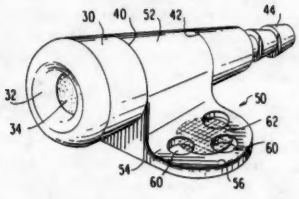
a separation section positioned between the said distal and proximate ends to form a first portion and a second portion of said body, said separation section having means to separate said second portion from said structure.

4,886,501

IMPLANTABLE DEVICE

Jimmie T. Johnston, Norwood, and Edward J. Sampson, Carlisle, both of Mass., assignors to Shiley Infusaid Inc., Norwood, Mass.

Continuation of Ser. No. 89,113, Aug. 25, 1987, abandoned. This application Feb. 6, 1989, Ser. No. 307,244
Int. Cl.[4] A61M *5/32*
U.S. Cl. 604—175 **20 Claims**



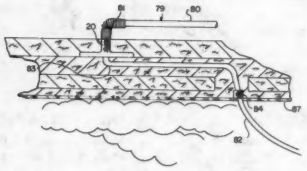
1. A body implantable access device comprising; a hollow port, said port having an inlet an outlet and an infusion chamber therebetween, a self sealing septum disposed in and covering said inlet, and said self-sealing septum positioned on said port at substantially a right angle to said outlet such that a needle puncturing said septum will be substantially in line with said outlet.

4,886,502

PERITONEAL ACCESS CATHETER

Victor L. Poirier, Chelmsford; Kurt A. Dasse, Needham; Mark A. Bowen, Stow, and Benedict D. T. Daly, Wellesley, all of Mass., assignors to Thermedics, Inc., Woburn, Mass.

Filed Dec. 9, 1986, Ser. No. 939,748
Int. Cl.[4] A61M *5/32*
U.S. Cl. 604—175 **13 Claims**



1. A peritoneal access system comprising:

a biocompatible percutaneous access device having a cylindrical neck portion for protrusion through the skin of a patient and an annular skirt portion for anchoring into the dermis/subcutaneous tissue interface said cylindrical neck portion having a textured surface to promote the ingrowth of the skin of the patient;

a catheter tube threaded through said neck and skirt portions, said neck portion dividing said catheter tube into an external catheter region and an internal catheter region, said external catheter region comprising a flexible bellows which can form a 90 degree angle adjacent said neck and providing means for absorbing shock when the external catheter is moved and said internal region of said catheter being bent approximately 90 degrees, with relation to said neck portion, adjacent said skirt portion to direct the catheter away from the percutaneous access device; and

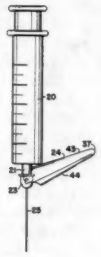
a collar frictionally fit and slidably mounted directly on said internal region of said catheter so as to be adjustably positionable along the length of the internal region of said catheter during implantation into the peritoneum to be positioned in close approximation to the peritoneum regardless of the thickness of the patient's abdominal wall thickness.

4,886,503

DISPOSABLE COVERED NEEDLE FOR SYRINGE

Ernest C. Miller, Jacksonville, Fla., assignor to University Medical Center, Inc., Jacksonville, Fla.

Filed May 23, 1988, Ser. No. 197,143
Int. Cl.[4] A61M *5/32*
U.S. Cl. 604—192 **11 Claims**



1. A throw-away covered needle for releasable attachment to a syringe having a short tubular inlet/exit pipe said covered needle consisting essentially of a needle member and a cover

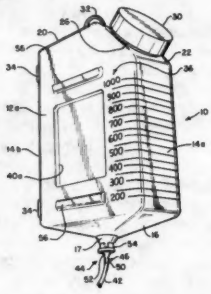
member; said needle member including a hollow needle with a free end and an encased end, said encased end being embedded in a head having a socket to receive said inlet/exit pipe, a passageway connecting said socket to the hollow of said needle, and two pivot pins projecting outwardly on opposite sides of said head generally perpendicular to the hollow of said needle; and said cover member being a semirigid elongated sheath enclosing said needle member and having passageways therethrough for attachment to said pivot pins, a lengthwise narrow opening extending from the top of said cover member to adjacent said free end of said needle and positioned to permit said needle to pass therethrough when said cover member is pivoted, and a rupturable plastic film covering said slot.

4,886,504

RESERVOIR/DISPENSING CONTAINER

Russell A. Arvidson, Mundelein, Ill.; James T. Renick, Bristol, Wis.; Robert D. Clegg, Pickerington, and Lawrence E. Zimmer, Dublin, both of Ohio, assignors to Abbott Laboratories, Abbott Park, Ill.

Filed Nov. 19, 1987, Ser. No. 122,980
Int. Cl.[4] A61M *5/185*
U.S. Cl. 604—257 **3 Claims**



1. A reservoir/dispensing container comprising a semi-rigid, generally rectangular container with four side walls haing discharge port means at one end thereof and means defining a closable fill opening adjacent the opposite end thereof and wherein said fill opening is defined in a beveled wall surface extending between said opposite end and one of said sidewalls, supporting means are provided on the side wall opposite said fill opening to facilitate supporting said container on its side, interengagable stacking means are provided on an opposing pair of said walls to permit stabilized stacking of two or more of said container, said interengagable stacking means being provided by a pattern of raised projections and/or ribs with the opposite side wall being provided with an identical pattern of depressions and/or grooves, adaptor means for connecting a feed tube or the like to said discharge port means, said adapter comprising a sleeve-like member having a first bored section at one end for sealed connection to said container discharge port means, a second bored section having a lesser diameter than said first bored section at the opposite end sealingly receiving an end of said tube and a flexible reduced thickness section intermediate said bored end sections which is conical in configuration whereby said intermediate adaptor section, rather than said tube, flexes upon application of a lateral force thereto.

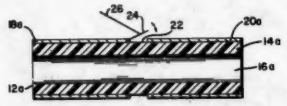
4,886,505

ANTIMICROBIAL SURFACES AND INHIBITION OF MICROORGANISM GROWTH THEREBY

John L. Haynes, Chapel Hill, and James D. Mansour, Raleigh, both of N.C., assignors to Becton, Dickinson and Company, Franlin Lakes, N.J.

Filed Jun. 7, 1985, Ser. No. 742,662
Int. Cl.[4] A61M *25/00*
U.S. Cl. 604—265 **1 Claim**

1. An apparatus comprising a medical device, a switch and a plurality of metals, a first of said metals being a coating on a surface of said device and a second of said metals being in contact with a surface of said device, said first and second metals defining a space therebetween, said switch being affixed to one of said metals, said metals being connected to each other through said switch when said switch is closed but unconnected when said switch is open, whereby biological activity is



imparted to a surface of the apparatus consequent to contact of said apparatus with an electrolyte of a living body when said switch is closed.

4,886,506

SOFT TIP CATHETER

Eric M. Lovgren, Dana Point, and Abdul-Kader A. El-Tibi, Costa Mesa, both of Calif., assignors to Baxter Travenol Laboratories, Inc., Deerfield, Ill.

Continuation of Ser. No. 946,491, Dec. 23, 1986, abandoned. This application Nov. 10, 1988, Ser. No. 271,351
Int. Cl.[4] A61M *25/00*
U.S. Cl. 604—280 **23 Claims**

1. A catheter comprising:
an elongated, flexible catheter body having a proximal end, a distal end, at least one lumen, and a distal end portion extending to the distal end of the catheter body;
the distal end portion being tapered and terminating proximally at a transition region which is nearer the distal end than the proximal end of the catheter body, the distal end portion having a cross sectional area that decreases toward the distal end; and
a a biocompatible tip member attached to the distal end portion and being softer than the distal end portion, said tip member terminating substantially at the distal end of the catheter body.

4,886,507

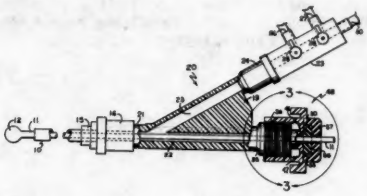
Y-CONNECTOR FOR ANGIOPLASTY PROCEDURE

William E. Patton, and William J. Lindsey, both of Dublin, Ohio, assignors to Medex, Inc., Hilliard, Ohio

Filed Feb. 1, 1988, Ser. No. 150,778
Int. Cl.[4] A61M *25/00*
U.S. Cl. 604—284 **6 Claims**

1. A Y-connector for an angioplasty procedure comprising,
a casing having a bore forming a main passageway for a catheter and having a branch passageway intersecting the main passageway,
a Tuohy-Borst valve in the main passageway,
and a membrane disposed in said main passageway, said

membrane being coaxial with and spaced from said Tuohy-Borst valve,



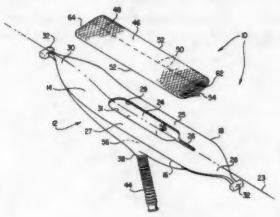
said membrane having a small hole for receiving a dilatation catheter.

4,886,508

LADIES EXTERNAL CATHETER ASSEMBLY

Douglas L. Washington, 4201 Spring Valley Rd., Ste. 1400, Dallas, Tex. 75244

Filed Jul. 11, 1988, Ser. No. 217,456
Int. Cl.[4] A61M *1/00*
U.S. Cl. 604—327 **32 Claims**



1. A ladies external catheter assembly comprising:

a resiliently deformable elongated catheter body having a thin wall enclosing a cavity, said wall including a cover panel with a centrally located elongated entrance opening between front and rear ends of the body, said opening being large enough to accept the urethra and surrounding tissue when said panel is placed in contact with a wearer's person, the body further having a full flow discharge outlet in the wall of the body, spaced below the cover panel, and

a removable elongated open mesh screen insert to fit in the catheter body spaced apart below the cover panel, the screen insert being resiliently deformable along with the body in response to user forces and tending to return the body to its original shape by supporting contact with the walls of the body, said screen insert having such open mesh construction which permits full flow passage of urine to the discharge outlet without significant resistance to flow.

4,886,509

DEVICE FOR COLLECTING AND ABSORBING URINE

Lars Mattsson, Utang 601, S-440 60 Skärhamn, Sweden

Continuation-in-part of Ser. No. 811,676, Dec. 20, 1985, abandoned. This application Feb. 11, 1988, Ser. No. 157,172
Int. Cl.[4] A61F *5/44*
U.S. Cl. 604—349 **5 Claims**

1. A device for collecting and absorbing urine, comprising:

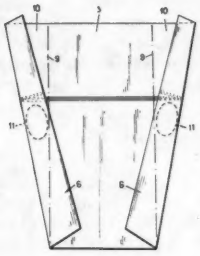
a laminate having a plurality of layers including a layer of outer plastic casing and a layer of material permeable to urine connected to said layer of plastic casing by sealing along the peripheral edges of each layer, said sealing forming an outer seam contour along the top, bottom and sides of the device;

said sealing defining an expandable space comprising the interior of the laminate;

an absorption body located in the expandable space comprising tissue integrated with a super-absorbent polymer which upon absorption expands to form a gel;

said absorption body being narrower than said laminate and located centrally within said laminate such that the difference between the outer seam contour and the absorption body forms outer flaps along the sides of the laminate;

said laminate being folded a first time transversely to said outer flaps approximately near the center of said laminate



so that the side edges of said laminate are in contact and the outer flaps overlap themselves in parallel; said side edges of said laminate being sealed together where they contact forming a pocket;

said outer flaps being folded over the absorption body at an angle with respect to the outer seam contour of the device; and

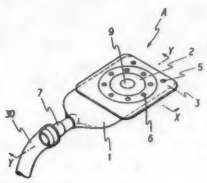
a patch of releasable adhesive located between the outer flaps and the main absorption body for adhering the outer flaps to the main absorption body prior to said absorption and for releasing said outer flaps from said absorption body when the absorption body assumes the gel phase, said released outer flaps automatically unfolding to achieve an expansion of the pocket.

4,886,510

URINE-COLLECTING DEVICE

Iwao Matsuura, Osaka, Japan, assignor to Nissho Corporation, Osaka, Japan

Continuation of Ser. No. 96,440, Sep. 15, 1987, abandoned, which is a division of Ser. No. 10,664, Feb. 4, 1987, abandoned. This application Jan. 18, 1989, Ser. No. 298,309
Claims priority, application Japan, Mar. 7, 1986, 61-51098; Jul. 31, 1986, 61-180993
Int. Cl.[4] A61F *5/44*
U.S. Cl. 604—353 **8 Claims**



1. A urine-collecting device comprising:

a relatively flat urine collecting bag having front and back sides, said front side being provided with a first relatively large round opening;

a flat film having a flexible thin portion and a thick portion around said flexible thin portion, said flexible thin portion having a diameter substantially equivalent to said first large round opening of said front side and having a thickness from 0.05 mm to about 0.2 mm, and said thick portion having a thickness from 0.5 mm to about 1.5 mm, said flexible thin portion being provided with a small hole at a center thereof, said small hole having a radially expandable contacting edge at an inner peripheral edge thereof through which a penis is to be inserted and having a diameter such that when the penis is inserted said radially expandable contacting edge expands to sealingly contact with a circumferential surface of the penis; and

a flat flange provided with a second relatively large round opening having a diameter equivalent to said first large round opening of said front side, said flange being secured to said front side of said urine collecting bag holding said flat film therebetween by adhering said front side to said flange coaxially.

4,886,511

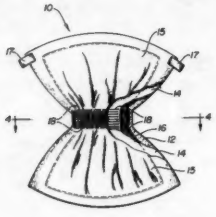
CORRUGATED DISPOSABLE DIAPER

Ralf Korpman, Bridgewater, N.J., assignor to Personal Products Company, Milltown, N.J.

Continuation of Ser. No. 15,245, Feb. 17, 1987, abandoned, which is a continuation of Ser. No. 595,206, Mar. 30, 1984, abandoned. This application Jun. 23, 1988, Ser. No. 210,610

Int. Cl.[4] A61F *13/16*

U.S. Cl. 604—365 **16 Claims**



1. A corrugated disposable diaper comprising:

(a) a liquid-permeable facing;

(b) an absorbent unit;

(c) an initially molten liquid impermeable film having first and second major surfaces;

(d) elastic corrugating means comprising multiple strands of stretched elastic placed transverse to the longitudinal axis of said diaper; and

(e) a backing fabric;

said absorbent unit being disposed adjacent the first major surface of the liquid-impermeable film and being smaller in dimension than the liquid-impermeable film so as to provide marginal regions of said liquid-impermeable film around said absorbent unit;

said liquid-permeable facing being secured to the first major surface of said liquid-impermeable film in said marginal regions so that the absorbent unit is secured between the liquid-impermeable film and the liquid-permeable facing;

said backing fabric being secured to the second major surface of said liquid-impermeable film; and

said elastic corrugating means being secured to the second major surface of said initially molten liquid-impermeable film in the central portion of said diaper.

4,886,512

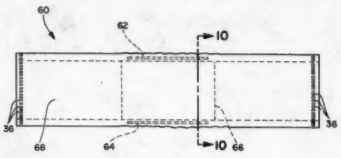
INCONTINENT GARMENT WITH ELASTICIZED POUCH

Joyce A. Damico, and Rebecca J. Weber, both of Neenah, Wis., assignors to Kimberly-Clark Corporation, Neenah, Wis.

Filed Apr. 4, 1983, Ser. No. 481,593

Int. Cl.[4] A61F *13/16*; A41B *9/12*

U.S. Cl. 609—385.2 **13 Claims**



1. A disposable, absorbent pouched pad comprising a generally rectangular impervious backsheet, a generally rectangular pervious body-side liner joined to said backsheet at their edges, an absorbent liner between the topsheet and the backsheet, elastic portions generally centered at the peripheral portions of the long edges of said generally rectangular liner and back sheet, wherein said pad width is between about 20 percent and about 35 percent of the extended total pad length, the length of said elasticized area when the elastic is in extended condition is between about 25 percent and about 60 percent of the total pad length and the shortening of the total pad length when the elastic relaxes is between about 15 and about 37 percent of the extended length.

4,886,513

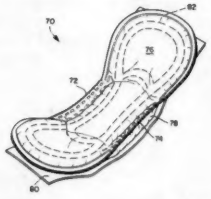
ABSORBENT PAD WITH REINFORCING MEMBER TO RESIST DEFORMATION

Stanley I. Mason, Jr., Weston, and Michael D. Handler, Norwalk, both of Conn., assignors to Kimberly-Clark Corporation, Neenah, Wis.

Continuation of Ser. No. 69,690, Jan. 6, 1987. This application Mar. 10, 1989, Ser. No. 321,615

Int. Cl.[4] A61F *13/16*

U.S. Cl. 604—385.1 **10 Claims**



1. A device for absorption of human exudate comprising an absorbent, a liquid permeable cover and a liquid-impermeable baffle cooperating to enclose said absorbent, and reinforcing means for shaping said device to conform to the body of a user, said reinforcing means having a predetermined arcuate shape prior to being assembled thereby imparting a cup-like shape to said device.

4,886,514

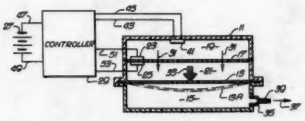
ELECTROCHEMICALLY DRIVEN DRUG DISPENSER

Henri J. R. Maget, La Jolla, Calif., assignor to IVAC Corporation, San Diego, Calif.

Continuation of Ser. No. 46,937, May 5, 1987, abandoned, which is a continuation-in-part of Ser. No. 729,860, May 2, 1985, abandoned. This application Mar. 2, 1989, Ser. No. 318,488

Int. Cl.[4] A61K 9/22

U.S. Cl. 604—891.1 16 Claims



1. An electronchemically driven drug dispenser comprising:

a container;

separating means disposed in the container and defining therein a drug chamber for receiving a drug and a gas pressure pump chamber separated from the drug chamber by the separating means;

an electrochemically active gas disposed in the pump chamber;

a membrane disposed in the pump chamber and defining therein a first pressure containment compartment and a second compartment, the separating means comprised in a side of the second compartment, the membrane comprising a non-electrolytic portion and an electrolytic portion, the non-electrolytic portion characterized by a first rate of diffusion of the gas therethrough from one of the components to the other, the diffusion rate being proportional to any difference between the pressure of the gas in one compartment and the pressure of the gas in the other compartment;

first and second electrodes disposed in the first and second compartments, respectively, on opposing sides of the electrolytic portion of the member, the gas being electrochemically reversibly active so as to enter into an anodic reaction at one electrode in which anodic reaction molecules of the gas are converted into ions that are transportable through the membrane and a cathodic reaction at the other electrode in which cathodic reaction ions are reconverted back into molecules of the gas;

means to provide an electric current to the electrodes, the current being operative to transport the ions through the electrolytic portion of the membrane whereby the gas is effectively pumped from one compartment to the other at a pumping rate determined by the polarity and magnitude of the current, the net rate of flow of the gas from one compartment to the other being equal to an algebraic sum of the pumping rate and the diffusion rate; and

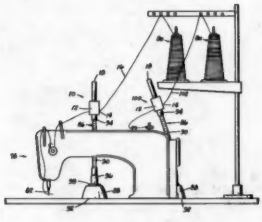
first control means to vary the magnitude and direction of the current with reference to the first diffusion rate to cause the gas to flow from the first compartment to the second sufficient to exert pressure on the separting means to discharge a drug from the chamber at a predetermined rate.

4,886,515

THREAD DYEING APPARATUS AND METHOD

Earl Kinnebrew, II, and Paul D. Palmer, Sr., both of Edmond, Okla., assignors to Rhema Enterprises, Inc., Edmond, Okla.

Filed May 27, 1987, Ser. No. 55,413
Int. Cl.[4] D06B *3/04*
U.S. Cl. 8—149 2 Claims



1. A method for dyeing a thread used in a sewing machine having a needle for applying the thread extending from a thread source wherein the sewing machine includes a bobbin thread, a bobbin thread source and a bobbin for receiving the bobbin thread, and wherein the dyeing occurs in the operation of the sewing machine, the method comprising the steps of:

applying dye to the thread at a position between the thread source and the needle comprising:

engaging portions of the thread with a dye applicator having a dye storage portion for storing a supply of dye and a dye applying portion in communication with the dye storage portion and adapted to engage the thread for applying dye thereto, and wherein the thread engages the dye applying portion as the thread moves from the thread source to the needle; and

positioning a second dye applicator near a portion of the bobbin thread, wherein the second dye applicator has a dye storage portion for storing dye and a dye applying portion in communication with the dye storage portion and adapted for engaging the bobbin thread for applying dye thereto; and

engaging portions of the bobbin thread with the dye applying portion of the second dye applicator as the bobbin thread moves from the bobbin thread source to the bobbin.

4,886,516

DIAMINOTETRAFLUOROETHOXYBENZENES, PROCESS FOR PRODUCING SAME AND HAIR COLORING AGENTS CONTAINING SAME

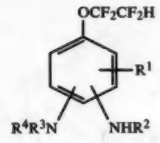
Eugen Konrad, Darmstadt, and Thomas Clausen, Alsbach, both of Fed. Rep. of Germany, assignors to Wella Aktiengesellschaft, Darmstadt, Fed. Rep. of Germany

Continuation of Ser. No. 758,203, Jul. 22, 1985, abandoned. This application Oct. 13, 1988, Ser. No. 258,041
Claims priority, application Fed. Rep. of Germany, Aug. 18, 1984, 3430513
Int. Cl.[4] C07C *85/11;* A61K *7/13*
U.S. Cl. 8—408 9 Claims

1. A composition for the oxidative coloring of hair, comprising:

a developer component; and

at least one coupler component selected from the group consisting of a compound of the formula:



wherein,

R^1 represents a substituent selected from the group consisting of hydrogen and an alkyl having from 1 to 4 carbon atoms; and

R^2, R^3, R^4 represent the same or different substituents independently selected from the group consisting of hydrogen, an alkyl having from 1 to 4 carbon atoms, a monohydroxyalkyl having from 1 to 4 carbon atoms and a dihydroxyalkyl having from 1 to 4 carbon atoms, provided that the amino groups are situated relative to one another in a positioning selected from the group consisting of ortho- and meta-,

and the acid addition salts of said compound.

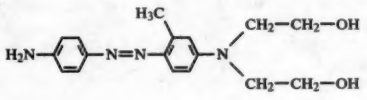
4,886,517

DYEING COMPOSITION FOR HUMAN HAIR CONTAINING AN AZO DYE

Andree Bugaut, Boulogne-Billancourt; Alex Junino, Livry-Gargan, and Jean Cotteret, Limay, all of France, assignors to L'Oreal, Paris, France

Continuation of Ser. No. 781,139, Sep. 27, 1985, abandoned. This application Oct. 31, 1988, Ser. No. 266,310
Claims priority, application Luxembourg, Oct. 1, 1985, 85 564
Int. Cl.[4] A61K *7/12;* C07C *107/06;* C09B *29/01, 29/085*
U.S. Cl. 8—416 25 Claims

1. Composition for dyeing human hair, which comprises, in an aqueous, alcoholic or aqueousalcoholic carrier, a tinctorially effective amount of 4-amino-2'-methyl-4'-[N,N-bis(β-hydroxyethyl)amino]phenylazobenzene of formula:



(II)

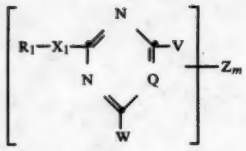
4,886,518

DYEING CELLULOSE FIBRES WITHOUT INCURRING ENDING WITH COLORLESS PYRIMIDINE, TRIAZINE, AROMATIC, FURFURYL OR QUINOLINYL COMPOUND

Jean-Marie Sire, Hegenheim, France, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Sep. 19, 1988, Ser. No. 245,488
Claims priority, application Switzerland, Oct. 1, 1987, 3823/87
Int. Cl.[4] D06P *1/62, 3/68*
U.S. Cl. 8—566 12 Claims

1. A process for dyeing cellulose fibres or cellulose-containing blend fibres with vat dyes, sulfur dyes, leuco vat ester dyes or azoic dyes by the pad dyeing process without incurring ending, which process comprises treating said fibres with an aqueous dyeing liquor, which, aside from the dye, contains a colourless compound of the formula



(1)

or of the formula

$$[R_1—NH—A—R_2]_m—Z_m \quad (2)$$

where

Q is

or =N—,

Y is hydrogen, halogen, cyano, C_1–C_5alkyl or C_1–C_5alkylsulfonyl,

V and W, independently of each other, are each R_2—X_2—, R_3—X_3—, hydroxyl, C_1–C_5alkoxy or an unsubstituted or C_1–C_5alkyl- or C_5–C_6cycloalkyl-monosubstituted or -disubstituted amino group, the alkyl radical being unsubstituted or substituted by hydroxyl, cyano, sulfo or sulfato,

R_1, R_2 and R_3, independently of one another, are each an aromatic, furfuryl or quinolinyl radical,

X_1, X_2 and X_3, independently of one another, are each —O—, —S—,

—NH—CO—Phen—NH— or NH—CO—Phen—CO—NH—,

R_4 is hydrogen, C_1–C_5alkyl, C_5–C_6cycloalkyl or phenyl,

Phen is an unsubstituted or substituted phenylene group,

A is a direct bond, —CO— or —CONH—,

Z is an acidic, water-solubilizing group and

m is 1 to 6.

4,886,519

METHOD FOR REDUCING SOX EMISSIONS DURING THE COMBUSTION OF SULFUR-CONTAINING COMBUSTIBLE COMPOSITIONS

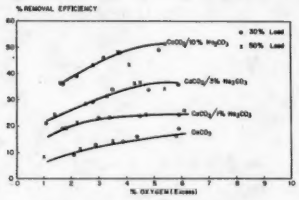
Michael E. Hayes, Fernandina Beach; Kevin R. Hrebenar; Jennifer L. Minor, both of Jacksonville, all of Fla., and Lawrence M. Woodworth, Huntington, N.Y., assignors to Petroleum Fermentations N.V., Willemstad, Netherlands

Continuation-in-part of Ser. No. 780,783, Sep. 27, 1985, and a continuation-in-part of Ser. No. 787,293, Oct. 15, 1985, which is a division of Ser. No. 653,808, Sep. 24, 1984, which is a continuation-in-part of Ser. No. 547,892, Nov. 2, 1983, Pat. No. 4,618,348. This application Apr. 23, 1987, Ser. No. 41,557

Int. Cl.[4] C10L *1/32*

U.S. Cl. 44—51 **50 Claims**

1. An improved method for reducing SOX emissions during combustion of a sulfur-containing combustible material wherein the improvement comprises adding to said combustible material, prior to combustion, 0.5–25% by weight of an



admixture of 80.99.5% by weight insoluble sulfur sorbent and 0.5–2.0% by weight soluble sulfur sorbent.

4,886,520

OIL COMPOSITIONS CONTAINING TERPOLYMERS OF ALKYL ACRYLATES OR METHACRYLATES, AN OLEFINICALLY UNSATURATED HOMO OR HETEROCYCLIC-NITROGEN COMPOUND AND ALLYL ACRYLATES OR METHACRYLATES OR PERFLUOROALKYL ETHYL ACRYLATES OR METHACRYLATES

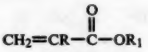
Hanh T. Le, Wilmington, Del., assignor to Conoco, Inc., Ponca City, Okla.

Filed Oct. 31, 1988, Ser. No. 265,626

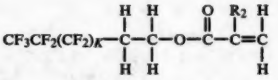
Int. Cl.[4] C10L *1/20*

U.S. Cl. 44—62 **25 Claims**

1. An oil composition which comprises a major amount of an oil selected from a crude oil or a fuel oil and a minor amount of (1) an alkyl ester of unsaturated monocarboxylic acid, (2) an olefinically unsaturated homo or heterocyclic-nitrogen compound and (3) a perfluoroalkyl ethyl acrylate or methacrylate terpolymer having pour point depressant properties, said terpolymer comprising the reaction product of (a) a monomeric alkyl ester of carboxylic acid or a mixture of alkyl esters of carboxylic acid having the formula:



wherein R is H or CH_3 and R_1 is alkyl having from about 1 to about 30 carbon atoms; (b) vinyl pyridine; and (c) a perfluoroalkyl ethyl acrylate or methacrylate or a mixture of perfluoroalkyl ethyl acrylates or methacrylates, said perfluoroalkyl ethyl acrylates or methacrylates having the formula:



wherein R_2 is H or CH_3, and K is an integer of from 1 to about 20.

4,886,521

DECAKING OF COAL OR OIL SHALE DURING PYROLYSIS IN THE PRESENCE OF IRON OXIDES

M. Rashid Khan, Morgantown, W. Va., assignor to U.S. Department of Energy, Washington, D.C.

Filed May 5, 1988, Ser. No. 190,429

Int. Cl.[4] C10L *5/00, 9/00*

U.S. Cl. 44—607 **19 Claims**

1. A method for producing a fuel from the pyrolysis of coal or oil shale comprising the steps of:

(a) pulverizing coal or oil shale,

(b) pulverizing iron oxide,
(c) mixing the pulverized coal or oil shale and the pulverized iron oxide,
(d) subjecting the pulverized mixture to a mechanical load, and
(e) heating the mechanically loaded mixture to pyrolysis temperature in a gas atmosphere which is substantially inert to said mixture, so as to substantially prevent said mixture from swelling, to form a product fuel.

4,886,522

PROCESS, FOR THE DESULFURIZATION OF COAL

James G. Davidson; Deborah A. Allard, both of Elizabeth Town; Philip J. Sawyer, and Philip E. Boynton, both of Marion, all of Ill., assignors to Malin Research Corporation, Marion, Ill.

Filed Mar. 3, 1988, Ser. No. 157,781
Int. Cl.[4] C10G *9/02*
U.S. Cl. 44—624 **14 Claims**

1. A process for the desulfurization of coal ore containing both organic and inorganic sulfur, comprising the steps of:
pulverizing coal ore to particle coal size less than 150 microns;
slurrying the particle coal with an effective concentration of abstraction chemicals comprised of at least one reagent for abstracting organic sulfur from the particle coal and water, creating a slurry solution;
mixing and reacting the abstraction chemicals with organic sulfur in the particle coal, such that the organic sulfur is abstracted from the particle coal and released to the slurry solution;
removing the abstracted organic sulfur and recyclable chemicals from the slurry solution by placing the slurry solution in contact with a membrane in a membrane cell through which the abstracted organic sulfur and recyclable chemical passes but through which the particle coal and water does not pass;
transferring the particle coal and water to a conditioner cell and mixing the particle coal and water with an effective concentration of conditioner reagents comprised of reagents for promoting the floatation of the particle coal and for the sedimentation of mineral type compounds in the conditioner cell;
transferring conditioned particle coal and water to at least one clarifying cell and regulating and mixing an effective concentration of frothing agent comprised of at least one chemical for inducing frothing in the clarifying cell;
separating inorganic sulfurs from the particle coal and water by sedimentation;
separating desulfurized particle coal from water by floatation;
transferring desulfurized particle coal to a dewatering device; and
dewatering the desulfurized particle coal and discharging recovered desulfurized coal product.

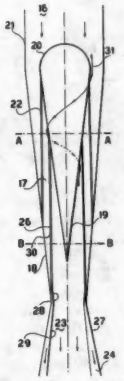
11. A process for chemical abstraction of organic sulfur from coal comprising:
pulverizing coal ore into particulates;
adding water and adjusting the pH to approximately 7.0;
adding a water soluble hydrogen donating chemical;
adding molybdenum dissolved in a liquid organic matrix selected from the group consisting of aromatic-olefins capable of reversibly reacting with H_2S; and
separating the coal particulates from the water, hydrogen donator, molybdenum and organic matrix.

4,886,523

PROCESS AND APPARATUS FOR AERODYNAMIC SEPARATION OF COMPONENTS OF A GASEOUS STREAM

Pierre E. Maldague, Avenue Winston Churchill 232, 1180 Brussels, Belgium

Filed May 10, 1988, Ser. No. 192,793
Claims priority, application Belgium, May 11, 1987, 08700507
Int. Cl.[4] B01D *45/12*
U.S. Cl. 55—1 **34 Claims**



1. A process for separating liquid and/or solid particles from a gaseous stream containing said particles suspended in a gaseous medium, said process comprising:
introducing the gaseous stream into a separation zone having an external wall, an internal wall and, between said walls, an array of deflecting blades and a separate array of straightening blades, said arrays each having generally rounded cross-sections, extending generally in the same direction as said axis and being spaced apart from one another in a direction transverse to said axis to define between them an intervening zone,
passing the stream into said intervening zone through said deflecting blades for accelerating the stream and for inducing within the accelerating flowing stream a swirl which causes the gaseous medium to follow helico-spiral streamlines in said intervening zone,
within the intervening zone, subjecting the swirling gaseous stream to acceleration, expansion and increased subsonic velocity while maintaining the resultant velocity in a major portion of the cross section of the gaseous stream substantially uniform upon those streamlines encompassed by said portion,
causing said particles in the swirling gaseous stream, with the aid of said substantially uniform resultant velocity and of their inertia, to separate from the encompassed streamlines under the influence of substantially similar centrifugal forces which drive the particles outward along paths which diverge from said streamlines and cause the particles to concentrate in an outer layer of the gaseous stream,
withdrawing at least part of said outer layer of the gaseous stream, with concentrated particles, from the separation zone, and
causing remaining gaseous medium not so withdrawn from the gaseous stream to decelerate, while suppressing its swirling motion, by passing it through the array of straightening blades of the separation zone.

4,886,524

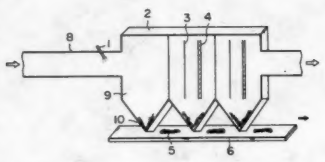
METHOD FOR TREATING WASTE LIQUID IN WET EXHAUST GAS TREATING APPARATUS

Naoharu Shinoda; Kenichi Yoneda; Masao Hino, all of Hiroshima; Kenzo Muramatsu, Tokyo; Masato Miyake, Tokyo; Taku Shimizu, Tokyo, and Hidehiko Otani, Kobe, all of Japan, assignors to Mitsubishi Jukogyo Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 2,869, Jan. 13, 1987, abandoned. This application Jun. 13, 1988, Ser. No. 207,925

Int. Cl.[4] B03C *3/01*

U.S. Cl. 55—8 **2 Claims**



1. A method for separating dust from an exhaust gas, comprising the steps of feeding the exhaust gas through a flue at a flue flow rate in the range of 15 to 20 m/s; spraying a waste liquid into the exhaust gas flowing within the flue at a point immediately adjacent the downstream end of the flue; introducing the wetted exhaust gas from the flue into a first vacant dust collection chamber having a hoppered outlet;

allowing the exhaust gas flow rate to be reduced within said first chamber such that waste liquid droplets sprayed into the exhaust gas have a residence time of approximately 2 seconds prior to the exhaust gas exiting said first chamber;

feeding the exhaust gas from said vacant chamber into a series of hoppered dust collection chambers, each of which include a discharge electrode and a dust collecting plate; and

removing the dust collected from each of the hoppered chambers.

4,886,525

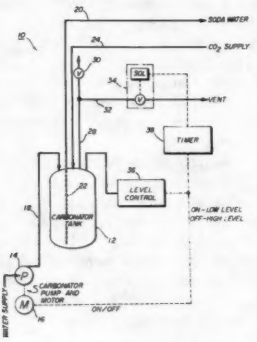
SYSTEM FOR IMPROVING CARBONATION IN POST-MIX DISPENSER CARBONATORS

George H. Hoover, Marietta, Ga., assignor to The Coca-Cola Company, Atlanta, Ga.

Division of Ser. No. 57,574, Jun. 2, 1987, Pat. No. 4,745,853. This application Feb. 8, 1988, Ser. No. 153,624

Int. Cl.[4] B01D *19/00*

U.S. Cl. 55—55 **12 Claims**



1. A method comprising:

(a) improving carbonation in a beverage dispenser having a continuous carbonation system employing a carbonator including a carbonator tank for holding a sufficient quantity of water for a plurality of drinks and having a continuously pressurized gas headspace above the water;

(b) said improving step including feeding CO_2 gas into said carbonator to maintain a continuously pressurized gas headspace above the water, automatically periodically venting said headspace to atmosphere, at predetermined times and for a predetermined length of time, and then feeding additional CO_2 gas into said carbonator under pressure.

4,886,526

ELECTRONIC AIR FILTRATION SYSTEM

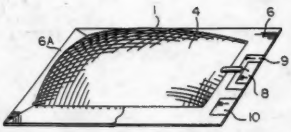
Costantinos J. Joannou, 8 Wright Street, Carleton Place, Ontario, Canada (K7C 4B3)

Filed Apr. 20, 1988, Ser. No. 183,785

Claims priority, application Canada, Apr. 22, 1987, 535275

Int. Cl.[4] B03C *3/00*

U.S. Cl. 55—131 **18 Claims**



1. In a charged media air filtration system, an air filter including a disposable air filter cartridge and an air filter cartridge support frame for receiving said cartridge comprising, in combination:

a pair of opposing electrically conductive outer screens;

a pair of dielectric fibrous filter pads each having side surfaces and disposed between said outer screens;

an electrically conductive inner screen having a peripheral edge and sandwiched between said fibrous filter pads, said filter pads overlapping one another and extending outwardly beyond the perimeter of said inner screen and including a marginal border at the peripheral edge of said screen such that said filter pads surround and insulate said inner screen;

electrode means piercing a side surface of at least one of said fibrous filter pads for electrically connecting said inner screen to a high voltage electrical current supply of one polarity; and

connecting means for electrically connecting said outer screens with a high voltage electrical current supply and having a polarity opposite that of said one polarity;

said air filter cartridge support frame including a frame for supporting said outer screens, said dielectric filter pads, said inner screen and said electrode and connecting means.

4,886,527

MULTILAYER ELECTRET FILTER AND PROCESS OF USING SAME

Walter Föttinger; Michael Hauber, and Arnold Weghmann, all of Weinheim, Fed. Rep. of Germany, assignors to Firma Carl Freudenberg, Weinheim/Bergstr., Fed. Rep. of Germany

Filed Sep. 9, 1988, Ser. No. 242,718

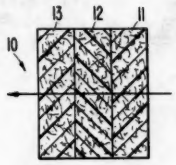
Claims priority, application Fed. Rep. of Germany, Sep. 19, 1987, 3731575

Int. Cl.[4] B03C *9/02;* **G11C** *13/02*

U.S. Cl. 55—156 **10 Claims**

1. A multilayer filter pack comprising at least first, second and third adjacent layers of fibrous electret material formed from fibers having a predetermined fiber diameter arranged in each layer at a predetermined packing density with each layer having a permanent electric charge and a thickness greater than twice the predetermined fiber diameter of its respective

layer and less than 10 mm wherein said first layer is disposed in a position upstream of the second layer and is formed from fibers having a fiber diameter in the range of 10 to 30 um arranged at a packing density in the range of 0.01 to 0.07, said second layer is formed from fibers having a fiber diameter in the range of 0.5 to 10 um arranged at a packing density in the range of 0.03 to 0.1., said third layer is disposed in a position downstream of said second layer and is formed from fibers having a fiber diameter approximately equal to the fiber diameter of the first layer arranged at a packing density approximately equal to the packing density of the first layer and the fiber diameter of said first and second layers decreases from the first layer to the second layer in the direction of flow and the packing density of said first and second layers increases from the first layer to the second layer in the direction of the flow wherein more than 50% of particles of a medium to be filtered having a grain size in the range of 10 to about 0.5 um are filtered by the first layer.

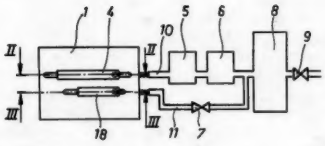


4,886,528

TUBULAR WATER SEPARATOR FOR A GAS ANALYZER

Olli Aaltonen; Antti Martikainen, both of Vantaa; Börje Rantala, Helsinki; Jan Ekström, Helsinki, and Osmo Toikka, Helsinki, all of Finland, assignors to Instrumentarium Corp., Finland

Filed May 12, 1988, Ser. No. 193,335
Claims priority, application Finland, May 5, 1987, 871975
Int. Cl.[4] B01D *13/00*
U.S. Cl. 55—158 **9 Claims**



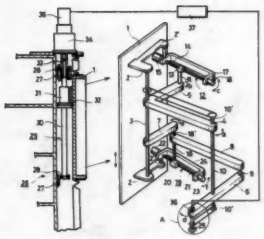
1. A water separator for a gas analyzer, comprising a housing, a first chamber disposed within said housing, a second chamber disposed within said housing, a wall formed of a gas permeable and liquid impermeable material separating said chambers, means for introducing a gas sample containing a liquid into said first chamber with a first portion of the gas passing through said wall to the second chamber and a second portion of the gas and said liquid remaining in the first chamber, means for flowing said first portion of the gas from the second chamber to a measuring unit, a receptacle mounted on the housing, a first conduit connecting said first chamber and said receptacle for conducting said second portion of said gas and said liquid to said receptacle, and a second conduit connecting the upper end portion of said receptacle with a source of vaccum for removing said second portion of said gas from said receptacle.

4,886,529

POLISHING ROBOT AND POLISHING METHOD USING THE SAME

Toshio Hashimoto, and Minoru Nakafuji, both of Amagasaki, Japan, assignors to Showa Precision Machinery Co., Ltd., Amagasaki, Japan

Filed Jul. 8, 1988, Ser. No. 216,555
Int. Cl.[4] B24B *49/00*
U.S. Cl. 51—165.71 **8 Claims**



1. In a direct-teaching and playback-type polishing robot comprising a polishing tool, means for moving said polishing tool in direction identified by cartesian X, Y and Z coordinates relative to a surface of a workpiece to be polished, and means for actuating said moving means, the improvement wherein said tool-moving means comprises:

a first arm pivotally mounted on a vertically standing cardinal shaft,

a second arm pivotally mounted on a second shaft secured at a free end of said first arm, said second arm carrying said polishing tool at an end thereof and said second shaft being mounted in parallel to said cardinal shaft, and

means for causing said first and second arms to swing independently about their respective shafts;

means for mounting said tool-moving means for slidable movement in the direction of the Z coordinate relative to the stationary base of said robot and workpiece; and

wherein said actuating means comprises:

means for reading and storing data defining the outline of the surface of said workpiece to be polished in X and Y coordinates as taught by the operator when manipulating said polishing tool along said outline;

means for establishing a program for scanning the surface of said workpiece enclosed by said outline with said polishing tool based on said stored data at a predetermined scanning speed and pitch in a predetermined direction with respect to the X and Y coordinates, said program

including data concerning a predetermined contact pressure to be exerted against the workpiece by the polishing tool in the direction of the Z coordinate;

computer-operated driving means for operating said tool-moving means in accordance with said program, and

means for causing the movement of said tool-moving means in the direction of the Z coordinate relative to the workpiece by the sliding movement thereof relative to said stationary robot base in response to the undulation of said workpiece along each scanning path.

4,886,530

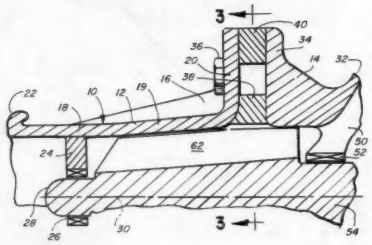
SINGLE STAGE PUMP AND SEPARATOR FOR TWO PHASE GAS AND LIQUID MIXTURES

Jules L. Dussourd, Princeton, N.J., assignor to Sundstrand Corporation, Rockford, Ill.

Filed Oct. 28, 1987, Ser. No. 114,238

Int. Cl.[4] B01D *19/00*

U.S. Cl. 55—199 **4 Claims**



1. A rotary machine for separating a two-phase mixture of a gas and a liquid and for pumping the liquid to a desired location, said machine comprising:

a generally tubular, elongated pump housing including a rotor receiving opening having a suction inlet on said opening at one end, a first outlet on said opening primarily for gas at the other end, and a second outlet on said opening for liquid intermediate said ends but in close adjacency to said other end;

said first inlet being primarily axially directed;

said second outlet being radially directed;

an elongated rotor disposed within said housing opening and extending between said ends, said rotor having a length to diameter ratio substantially in excess of one;

a plurality of generally axially elongated, radially extending vanes carried on said rotor for rotation therewith, said vanes adjacent said one end being configured to provide an inducer section and adjacent said other end being configured to provide an exducer section;

a volute connected to said pump housing and surrounding said second outlet; and

a diffuser between said volute and said second outlet.

4,886,531

AIR FILTER CASING OF AN INTERNAL COMBUSTION ENGINE

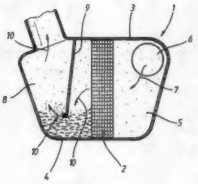
Norbert Lütze, Esslingen, Fed. Rep. of Germany, assignor to Daimler-Benz AG, Stuttgart, Fed. Rep. of Germany

Filed Sep. 30, 1988, Ser. No. 251,583

Claims priority, application Fed. Rep. of Germany, Oct. 1, 1987, 3733213

Int. Cl.[4] B01D *46/02, 47/00*

U.S. Cl. 55—244 **10 Claims**



1. Air filter casing arrangement for an internal combustion engine comprising:

an air filter casing having an upper part and a bottom;

a filter element which is adjacent to both the upper part of the casing and the bottom of the casing and which devides the volume occupied by the air filter casing into an unfiltered air chamber for receiving the uncleaned combustion air and a clean air chamber for receiving the cleaned combustion air; and

a swirling device provided in the clean air chamber, which starts from the upper part of the casing and ends in the area near to the bottom of the casing to form an area of diminished cross section within the casing for creating a high velocity flow of intake air between a bottom side of the swirling device and a surface of water which settles at the bottom of the casing to cause a swirling of the water and a formation of very fine water droplets which mix with the intake air for aspiration by the internal combustion engine.

4,886,532

APPARATUS FOR REMOVING AND FILTERING DIRTY AIR FROM EQUIPMENT

Bernhard Zimmerman, Ebersbach, Fed. Rep. of Germany, assignor to Zinser Textilmaschinen GmbH, Fed. Rep. of Germany

Filed May 6, 1988, Ser. No. 190,884

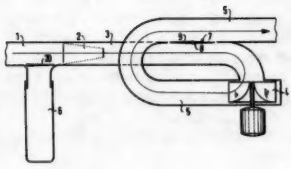
Claims priority, application Fed. Rep. of Germany, May 7, 1987, 3715217

Int. Cl.[4] B01D *46/04*

U.S. Cl. 55—302 **14 Claims**

1. Apparatus for removing and filtering dirty air from equipment such as textile spinning machines, comprising:

a suction duct through which dirty air is drawn from the equipment;
an intermediate duct communicated with said suction duct and extending therefrom to an outer end;
a filter unit disposed in said intermediate duct;
a blower having its air intake at said outer end of said intermediate duct;
a discharge duct having an inner end at the discharge of said blower and an outer end;
said intermediate and discharge ducts being at least partially contiguous along a common wall and being communicated with one another across a common opening in said common wall, said ducts defining a chamber surrounding said opening, said chamber having two inlets and two outlets, each inlet being associated with a respective outlet, and a shiftable wall portion; and
means for shifting said shiftable wall portion within said chamber,
said shiftable wall portion being shiftable between a common wall disposition in which it closes said common opening, whereby said intermediate duct defines one associated pair of said chamber inlets and outlets and said discharge duct defines the other associated pair of said chamber inlets and outlets and air flows through said intermediate duct to said blower air intake and is discharged along said discharge duct and through said discharge duct outer end, and a reverse air flow diverting disposition in which said shiftable wall portion is positioned across said chamber generally transversely of said common opening, whereby air is flowed through said discharge duct and diverted by one side of said shiftable wall portion into said intermediate duct, with said intermediate duct and said discharge duct defining one associated pair of said chamber inlets and outlets with respect to the air diverted by said one side of said shiftable wall portion, the air then being discharged by said blower through said discharge duct and diverted by the other side of said shiftable wall portion into said intermediate duct, with said intermediate duct and said discharge duct defining the other associated pair of said chamber inlets and outlets with respect to the air diverted by said other side of said shiftable wall portion and the reverse air flow impacting said filter unit to dislodge accumulated residue therefrom.

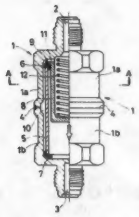


4,886,533

GAS FILTER

Kimiaki Sakashita, Funabashi; Masaaki Kouno, Matsudo, and Hideo Tsukazaki, Toride, all of Japan, assignors to Nihon Cement Co., Ltd., Tokyo, Japan

Filed Sep. 29, 1988, Ser. No. 251,186
Claims priority, application Japan, Jul. 5, 1988, 63-89353[U]
Int. Cl.[4] B01D *46/10*
U.S. Cl. 55—498 **4 Claims**



1. A gas filter, comprising:
a cylindrical casing having a first end with a gas inlet opening and a second end with a gas outlet opening;
a cylindrical ceramic filter arranged concentrically in said casing so that a clearance exists between said filter and said casing;
a first ring-shaped seal interposed between a first end of said ceramic filter and said casing;
a bottom-form cylindrical spring receiver having an open end with an external circumference on which a flange is provided, said flange being arranged outside a second end of said ceramic filter, a bottom end of said spring receiver being arranged concentrically within said ceramic filter so that a clearance exists between said spring receiver and said ceramic filter;
a second seal interposed between the second end of said ceramic filter and said flange of said spring receiver; and
a spring arranged between the bottom of said spring receiver and said casing so as to urge said first seal and second seal in a direction of compression.

4,886,534

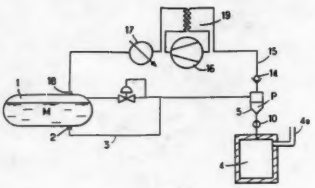
PROCESS FOR APPARATUS FOR CRYOGENIC COOLING USING LIQUID CARBON DIOXIDE AS A REFRIGERATING AGENT

Joseph Castan, Herblay, France, assignor to Societe Industrielle de l'Anhydride Carbonique, France

Filed Aug. 3, 1988, Ser. No. 227,651
Claims priority, application France, Aug. 4, 1987, 87 11237
Int. Cl.[4] B29C *3/00*
U.S. Cl. 62—35 **22 Claims**

1. In a process for cryogenic cooling including the steps of expanding the liquid CO_2 cooling agent in at least one expansion and separation appliance upstream and in the vicinity of an operating chamber, extracting the CO_2 in solid form from the appliance to expel and disperse it into the chamber in a discontinuous manner, and returning the CO_2 in its gaseous phase from the appliance to a tank via a reliquefaction circuit not

connected to the atmosphere, the improvement being utilizing a pressure up to 5.18 bars for the expansion and separation, and



extracting the gaseous CO_2 between two phases of expulsion of the solid CO_2 as a result of expansion inside the expansion and separation appliance.

4,886,535

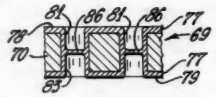
FEEDER FOR GLASS FIBERS AND METHOD OF PRODUCING

Mohinder S. Bhatti, Newark, Ohio, assignor to Owens-Corning Fiberglas Corporation, Toledo, Ohio

Continuation of Ser. No. 378,297, May 14, 1982, abandoned. This application Jul. 27, 1984, Ser. No. 634,198

Int. Cl.[4] B21D *28/24;* **C03B** *37/025*

U.S. Cl. 65—1 **12 Claims**



1. A method of producing a glass fiber forming feeder for supplying molten streams of glass to be attenuated into filaments comprising:

positioning a refractory metal core between oxygen impervious, precious metal layers to form a pre-laminate unit, said core having apertures extending therethrough;

evacuating said pre-laminate unit;

joining said precious metal layers to seal said evacuated pre-laminate unit;

cold isostatically pressing said sealed unit to move a portion of said layers into said apertures into intimate contact with substantially all of the core defining said apertures; and then

hot isostatically pressing said sealed unit to intimately bond said precious metal layers to said core including the portion of the core defining said apertures to form a laminate to prevent the oxidation of said core at elevated temperatures, said aperture being adapted to flow said molten glass therethrough to form said streams.

12. The feeder produced according to the method of claims 1, 5 or 9.

4,886,536

METHOD OF USING EVENLY DISTRIBUTED AIR FLOW TO CONDITION GLASS FILAMENTS PRIOR TO APPLICATION OF SIZING

David F. Lewin, Amarillo, Tex., assignor to Owens-Corning Fiberglas Corporation, Toledo, Ohio

Continuation of Ser. No. 85,120, Aug. 14, 1987, abandoned. This application Oct. 13, 1988, Ser. No. 257,378

Int. Cl.[4] C03B *37/02, 25/02*

U.S. Cl. 65—3.1 **4 Claims**

1. A method for forming continuous glass fibers consisting essentially of the steps of:

supplying a plurality of streams of molten glass from a bushing;

drawing the streams into continuous filaments;

passing a stream of air across the continuous filaments in a direction of between approximately 20°–30° below horizontal to cool and regulate the temperature of the continuous filaments, thus maintaining the continuous filaments at a predetermined temperature while keeping the continuous filaments essentially free of moisture;

thereafter applying a sizing material to the cooled continuous filaments in a concentration sufficient to result in the continuous filaments' having a moisture content of below about 6%, by weight;

collecting the continuous filaments on a spindle or collet.

4,886,537

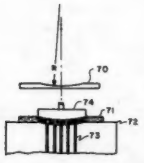
METHOD OF MAKING WIDE ANGLE AND GRADED ACUITY INTENSIFIER TUBES

E. Vincent Patrick, Laurel, Md., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Division of Ser. No. 160,238, Apr. 21, 1988. This application Feb. 1, 1989, Ser. No. 304,623

Int. Cl.[4] C03B *23/207*

U.S. Cl. 65—4.3 **1 Claim**



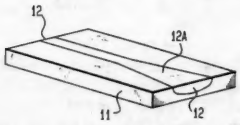
1. A method for making a microchannel plate comprising the steps of:

forming a fiber optic plate with broad flat opposed input and output parallel faces;

forming a spherical concave surface on said output face;

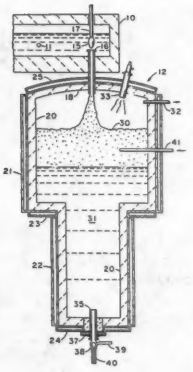
supporting said plate by its perimeter over a spherical concave die with said input face facing said die;
heating said plate to its softening temperature until it sags into intimate contact with said die; and
cooling said plate to a solid.

4,886,538
PROCESS FOR TAPERING WAVEGUIDES
Amaresh Mahapatra, Acton, Mass., assignor to Polaroid Corporation, Cambridge, Mass.
Continuation of Ser. No. 78,589, Jul. 28, 1987, abandoned. This application Nov. 4, 1988, Ser. No. 267,440
Int. Cl.[4] C03C *21/00*
U.S. Cl. 65—30.13 **6 Claims**



1. A process for making a waveguide whose cross-section changes along its length to enhance coupling, said process comprising the steps of:
initially forming an elongated channel waveguide having exposed ends structured for coupling, said elongated channel waveguide being formed in a substrate and provided with a predetermined lengthwise cross-sectional geometry having a predetermined width by selectively doping the substrate with ions of a species that raises the index of refraction of the substrate, the concentration of said index raising species of ions and the width of said cross-section both being constant over the length of the waveguide; and
selectively applying heat along said elongated channel waveguide to change its cross-sectional geometry and dopant per unit volume concentration of said index raising ion species as a function of length along a selected length of said waveguide by further diffusing said index raising ion species widthwise and depthwise in said substrate while retaining the initial cross-section and concentration along the remaining length of the waveguide the lengthwise distribution of said applied heat being such that the product of the concentration of said index raising ion species taken as dopant per unit volume of substrate and the width of said waveguide at any lengthwise section of the waveguide remains constant along the length of the waveguide so that the modal content of said waveguide remains unchanged throughout the length of said waveguide while its cross-sectional geometry changes from one end thereof to the other so that said waveguide ends can be coupled with external devices of matching geometry and modal content; the selectively applying step providing a taper in said channel waveguide.

4,886,539
METHOD OF VACUUM REFINING OF GLASSY MATERIALS WITH SELENIUM FOAMING AGENT
Richard L. Gerutti; David R. Haskins, both of Cumberland; Robert B. Heithoff, LeVale; Ronald L. Schwenninger, Ridgely, and Wright M. Welton, Oldtown, all of Md., assignors to PPG Industries, Inc., Pittsburgh, Pa.
Filed Apr. 3, 1989, Ser. No. 331,780
Int. Cl.[4] C03B *5/225*
U.S. Cl. 65—135 **16 Claims**

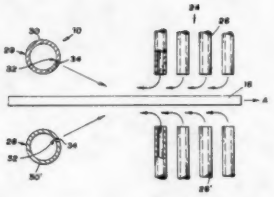


1. A method of refining glassy materials or the like wherein a stream of molten material is foamed as it is subjected to subatmospheric pressure, the improvement comprising providing in the molten material prior to being subjected to the subatmospheric pressure a quantity of a material selected from the group consisting of selenium, tellurium, and mixtures thereof to enhance the volume expansion of the foam.

4,886,540
BLOW BACK CONTROL DEVICE FOR A GLASS SHEET TEMPERING SYSTEM
David B. Nitschke, Perrysburg, Ohio, assignor to Glasstech International L.P., Scarsdale, N.Y.
Filed Jul. 25, 1988, Ser. No. 223,913
Int. Cl.[4] C03B *27/04*
U.S. Cl. 65—351 **13 Claims**

1. In a glass tempering system that processes a sheet of glass that has been heated in a glass heating furnace, the furnace including an exit portion having an exit opening through which the heated glass sheet is discharged from the furnace by a glass sheet conveyor in a direction of glass sheet conveyance, the glass tempering system also having a quenching station, including the blastheads, adjacent the exit portion of the furnace for applying cooling gas to the heated glass sheet, a blow-back control device comprising: an air supply member for supplying a planar jet of high pressure air across the exit opening; said member being mounted adjacent the exit opening between the glass heating furnace and the quenching station; said planar jet of high-pressure air being directing for supply-

ing block-back control air generally in the direction of glass sheet conveyance away from the exit opening of the furnace and toward the quenching station at an angle in the range of between 0 and 25 degrees formed between the planar jet and a



plane of conveyance of the glass sheet along the conveyor to thereby deflect cooling air, supplied by the blastheads and travelling along the glass sheet during the tempering, from entering the exit opening of the furnace.

4,886,541

METHOD FOR TREATING CEREAL CROP SEED WITH CHITOSAN TO ENHANCE YIELD, ROOT GROWTH AND STEM STRENGTH

Lee A. Hadwiger, Pullman, Wash., assignor to Washington State University Research Foundation, Pullman, Wash.

Filed May 25, 1988, Ser. No. 198,677
Int. Cl.[4] A01N *43/16*
U.S. Cl. 71—77 **15 Claims**

1. A method of enhancing stem diameter and root development in wheat plants comprising the step of applying chitosan in an effective amount to wheat seed prior to planting wherein the rate of application of the chitosan is between 60 μg per gram of wheat seed and 1000 μg per gram of wheat seed.

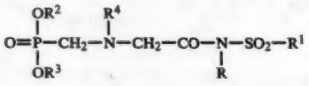
4,886,542

HERBICIDE COMPOSITIONS OF N-(PHOSPHONOMETHYLGLYCYL) SULFONYLAMINES AND PROCESS FOR USING SAME

Guy Borrod, and Guy Lacroix, both of Lyons, France, assignors to Rhone-Poulenc Agrochimie, Lyons, France

Division of Ser. No. 818,722, Jan. 14, 1986, Pat. No. 4,675,429.
This application Apr. 7, 1987, Ser. No. 35,176
Claims priority, application France, Jan. 14, 1985, 85 00619
Int. Cl.[4] A01N *57/02*
U.S. Cl. 71—087 **10 Claims**

1. A weeding process wherein an effective amount of a compound of the formula:



wherein:

R is hydrogen or alkyl having from 1 to 4 carbon atoms;

R^1 is alkyl having from 1 to 4 carbon atoms, and substituted with hydrogen or halogen;

R^2 is hydrogen or R^{21};

R^{21} is a radical having the same meaning as R^3;

R^3 is aryl substituted with hydrogen, halogen, alkyl, haloalkyl, alkoxy, cyano, alkylthio, aryloxy, arylthio or alkoxycarbonyl; and

R^4 is hydrogen or a hydrogenolysable group, R^8; and

R^8 is $Ar(R^5)(R^6)C-$ wherein Ar is aryl, each of R^5 and R^6 is hydrogen, aryl or alkyl, is applied to the foliage of the plants to be eradicated.

4,886,543

CRYOPROTECTANT COMPOSITION

Charles C. Shin; Nicolai A. Favstritsky, and Ahmad Dadgar, all of West Lafayette, Ind., assignors to Great Lakes Chemical Corporation, West Lafayette, Ind.

Filed Jul. 7, 1988, Ser. No. 216,126
Int. Cl.[4] A01N *43/08*
U.S. Cl. 71—88 **12 Claims**

1. A method of increasing the resistance of plant tissue to damage caused by freezing conditions comprising applying to the plant tissue surfaces at ambient non-freezing air temperatures at least about four hours prior to exposure to such freezing conditions an aqueous solution containing an effective amount of tetrahydrofurfuryl alcohol, tetrahydrofurfuryl amine or mixtures thereof as a cryoprotectant component.

4,886,544

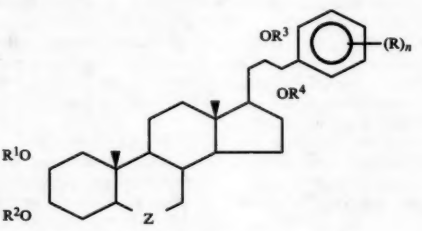
23-PHENYLBRASSINOSTEROIDS

Sei-ichi Hayashi, 2-5-12 Asamadai; Tadashi Hohjoh, 1-130 Nishi-Miyashita, Ageo, both of Ageo-shi, Saitama-ken; Atsuhiko Shida, 3-11-6 Higashi-Honcho, Koha-shi, Ibaraki-Ken, and Nobuo Ikekawa, 2-21-5 Higashi-Cho, Kichijoji, Musashino-shi, Tokyo, all of Japan

Filed Mar. 3, 1988, Ser. No. 163,526
Claims priority, application Japan, Mar. 17, 1987, 62-59934
Int. Cl.[4] A01N *43/00*
U.S. Cl. 71—88 **7 Claims**

1. A brassinosteroidal compound represented

(I)



wherein Z represents

n represents an integer of 1 to 3,

R represents hydrogen, halogen, CF_3, lower alkyl, lower alkoxy or $-CO_2R'$, wherein R' represents hydrogen, alkali metal or lower alkyl, and R^1, R^2, R^3 and R^4 represent hydrogen or acyl, respectively,

with the proviso that when n is 2 or 3, R may represent substituents which may differ each from one or more of the others.

4,886,545
COMPOSITIONS COMPRISING 1-SUBSTITUTED AZACYCLOALKANES AND THEIR USES

James V. Peck, Costa Mesa, and Gevork Minaskanian, Irvine, both of Calif., assignors to Nelson Research & Development Company, Irvine, Calif.

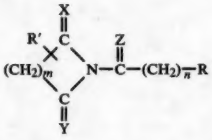
PCT No. PCT/US87/00191, § 371 Date Jul. 23, 1987, § 102(e) Date Jul. 23, 1987, PCT Pub. No. WO87/04594, PCT Pub. Date Aug. 13, 1987

PCT Filed Jan. 29, 1987, Ser. No. 98,028

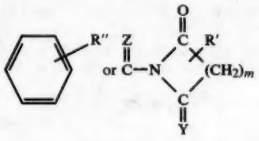
Int. Cl.[4] A01N *43/36, 43/40, 43, 46*

U.S. Cl. 71—88 6 Claims

1. A method for improved delivery of plant nutrients comprising contacting a plant with a composition comprising an effective amount of a plant nutrient and an effective delivery-enhancing amount of compound having the structural formula



wherein each X, Y and Z may represent oxygen, sulfur or two hydrogen atoms, provided however that, when Z represents two hydrogen atoms, both X and Y represent oxygen or sulfur and when Z represents oxygen or sulfur at least one of X and Y must represent oxygen or sulfur; m is 2–6; R′ is H or a lower alkyl group having 1–4 carbon atoms; n is 0–16 and R is $-CH_3$,



wherein R″ is H or halogen

4,886,546
PYRONE-3-CARBOXAMIDE COMPOUNDS AND HERBICIDAL COMPOSITION THEREOF

Hiroshi Yagihara; Yukihisa Goto; Kazuhisa Masamoto, all of Himeji; Yasuo Morishima, Kobe, and Hirokazu Osabe, Himeji, all of Japan, assignors to Daicel Chemical Industries Ltd., Osaka, Japan

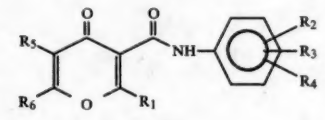
Filed Mar. 11, 1987, Ser. No. 24,348

Claims priority, application Japan, Mar. 11, 1986, 61-53484; Jun. 25, 1986, 61-149137

Int. Cl.[4] A01N *43/00;* C07D *311/74, 311/94*

U.S. Cl. 71—88 8 Claims

1. A compound of the formula (I)



(I)

wherein:

R_1 is a C_{2-11} alkyl, a lower alkenyl, a lower alkynyl, a cycloalkyl, a lower alkoxyalkyl, a lower haloalkyl, an aralkyl selected from the group consisting of benzyl, 3-phenylpropyl and 4-phenylbutyl; or a substituted aralkyl selected from the group consisting of benzyl, 3-phenylpropyl and 4-phenylbutyl, wherein the phenyl group is substituted by halogen, lower alkyl, lower alkoxy, or cyano; or phenyl; or a phenyl substituted by halogen, lower alkyl, lower alkoxy, nitro or cyano;

R_2, R_3 and R_4 are the same or different, and each is hydrogen, a halogen, cyano, nitro, amino, a lower alkyl, a lower haloalkyl, hydroxy, a lower alkoxy, an phenyloxy, naphthyloxy, carboxy or a lower alkoxycarbonyl;

R_5 and R_6 are combined to form a group of $-(CH_2)_m-$, wherein m is 3 or 4.

4,886,547
POWDER MANUFACTURING APPARATUS AND METHOD THEREFOR

Hideaki Mizukami; Kentaro Mori; Akichika Ozeki; Takaho Kawawa; Yuji Sugitani; Hirokazu Nomura; Tadashi Fujioka, and Hirotaka Nakagawa, all of Chiyoda, Japan, assignors to Nippon Kokan Kabushiki Kaisha, Tokyo, Japan

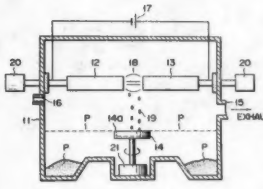
PCT No. PCT/JP87/00687, § 371 Date May 16, 1988, § 102(e) Date May 16, 1988, PCT Pub. No. WO88/01919, PCT Pub. Date Mar. 24, 1988

PCT Filed Sep. 17, 1987, Ser. No. 204,426

Claims priority, application Japan, Sep. 19, 1986, 61-221343; Feb. 20, 1987, 62-37064; Feb. 26, 1987, 62-41323; Apr. 23, 1987, 62-98679; Apr. 23, 1987, 62-98682; Apr. 28, 1987, 62-103102; Apr. 28, 1987, 62-103104; Jul. 10, 1987, 62-227328; Sep. 10, 1987, 62-227326; Sep. 10, 1987, 62-227327; Sep. 10, 1987, 62-227325; Sep. 10, 1987, 62-227329; Sep. 10, 1987, 62-227330

Int. Cl.[4] B22F *3/00*

U.S. Cl. 75—0.5 C 77 Claims



1. A powder manufacturing apparatus comprising:

a chamber;

a plurality of electrodes arranged in said chamber to be spaced from each other, at least one of said electrodes being a consumable electrode;

droplet forming means for generating an arc between said electrodes to melt a portion of the consumable electrode and thereby form droplets of a molten metal;

a disk aligned vertically with and below said portion of the consumable electrode and arranged to directly receive the droplets from the melting portion of the consumable electrode; and

disk rotating means for rotating said disk, to scatter and cool the droplets dropped on said disk, in order to form a powder.

4,886,548
FIREPROOFING OF BUILDING MATERIALS

John G. Helmstetter, Brick, N.J., assignor to Core-Guard Industries, Inc., Asbury Park, N.J.

Filed Apr. 14, 1989, Ser. No. 337,941

Int. Cl.[4] C09D *5/16, 1/02*

U.S. Cl. 106—18.12 4 Claims

1. A coating solution for application on building materials to achieve fireproofing thereof comprising two parts, Part A, the first part, comprising an equal mixture of three liquid silicates of varying viscosities with the following composition:

(a) a solution of about 8.9% Na_2O and about 28.7% SiO_2 and having a specific gravity of between 35–40° Baume;

(b) a solution of about 11.0% Na_2O and about 31.7% SiO_2

and having a specific gravity of between 40–50° Baume; and,

(c) a solution of about 8.3% K_2O and about 20.8% SiO_2 and having a specific gravity of between 65–85° Baume;

and Part B, the second part, comprising an aqueous mixture of equal amounts of acetic acid, borax, kaolin, zinc oxide and sodium bicarbonate.

4,886,549

VAT DYE AND SULFUR DYE COMPOSITIONS

Zdenek Koci, Binningen, Switzerland, assignor to Ciga-Geigy Corporation, Ardsley, N.Y.

Continuation of Ser. No. 708,145, Apr. 9, 1985, which is a continuation of Ser. No. 335,428, Dec. 29, 1981, Pat. No. 4,519,805. This application Mar. 8, 1988, Ser. No. 169,093

Claims priority, application Switzerland, Dec. 30, 1980, 9644/80

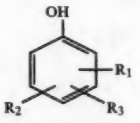
Int. Cl.[4] C09D *11/00*

U.S. Cl. 106—19 **15 Claims**

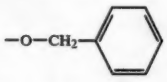
1. A dyestuff composition containing:

(a) a vat dye or sulfur dye; and

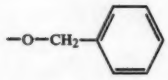
(b) a vatting accelerator of the formula



wherein R_1, R_2 and R_3 independently of one another are C_3–C_{12}-alkenyl, $—CH_2OH$, hydrogen, halogen, OH, C_1–C_4-alkoxy, cyclohexyl, unsubstituted or substituted phenyl, benzyl or phenethyl, or the group



or R_1 is C_1–C_5-alkyl and R_2 and R_3 independently of each other are C_1–C_5-alkyl, C_3–C_{12}-alkenyl, $—CH_2OH$, halogen, OH, C_1–C_4-alkoxy, cyclohexyl, unsubstituted or substituted phenyl, benzyl or phenethyl, or the group



with the provisos that:

(1) R_1, R_2 and R_3 are not simultaneously hydrogen; and

(2) if one of the radicals R_1, R_2 and R_3 is —OH or $—CH_3$, at most one of the remaining two radicals is hydrogen; wherein the proporton of (a) to (b) is 100 parts of (a) to 0.1 to 20 weight percent of (b).

4,886,550

FLEXIBLE GROUT COMPOSITION AND METHOD

William Alexander, Naperville, Ill., assignor to American Colloid Company, Arlington Heights, Ill.

Continuation-in-part of Ser. No. 61,493, Jun. 15, 1987, Pat. No. 4,797,158, which is a continuation-in-part of Ser. No. 849,048, Apr. 7, 1986, Pat. No. 4,696,699, which is a continuation-in-part of Ser. No. 787,505, Oct. 15, 1985, Pat. No. 4,696,698. This application Oct. 3, 1988, Ser. No. 251,804

The portion of the term of this patent subsequent to Sep. 29, 2004, has been disclaimed.

Int. Cl.[4] C04B *12/04*

U.S. Cl. 106—74 **18 Claims**

1. A grout composition for admixture with water to form a gelled grout essentially impermeable to water comprising, where percentages are percent by weight of the composition before admixture with water:

10–80% water-swellable clay;

0–80% solid, essentially non water-swellable particulate filler; and

5–20% by weight of the water-swellable clay dispersing agent for the water-swellable clay.

4,886,551

METHOD FOR IMPROVING THE SCRATCH RESISTANCE AND INCREASING THE SLIDING ABILITY OF COATED SURFACES AND IMPROVED COATING MATERIALS

Hans-Ferdi Fink, Essen; Roland Berger, Bochum; Wernfried Heilen, Alpen, and Peter Muss, Essen, all of Fed. Rep. of Germany, assignors to Th. Goldschmidt AG, Essen, Fed. Rep. of Germany

Filed Oct. 6, 1987, Ser. No. 106,560

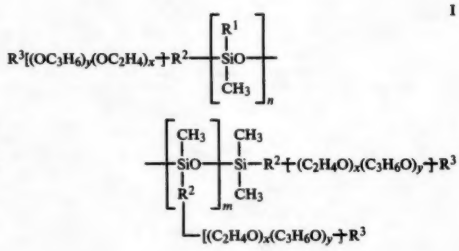
Claims priority, application Fed. Rep. of Germany, Oct. 31, 1986, 3637155

Int. Cl.[4] C08L *1/08*; C07C *101/72*

U.S. Cl. 106—183 **12 Claims**

1. In a coating composition selected from the group consisting essentially of a paint, a lacquer or a varnish adapted to be applied to a substrate to form a scratch-resistant coating on the substrate which has pronounced sliding capability, the improvement which comprises that the composition comprises an amount effective to reduce sliding resistance of a compound of the general formula

I



wherein

R^1 is alkyl with 1 to 8 carbon atoms,

R^2 is —O— or $—(CH_2)_pO—$, in which p =2, 3 or 4,

R^3 is hydrogen, alkyl with 1 to 4 carbon atoms or acyl,

n is 40 to 60, and

m is 0 to 3,

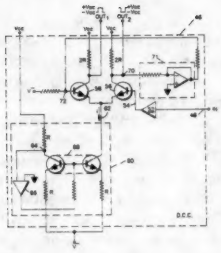
x and y being selected so that the molecular weight of the polyoxyalkylene block is 1400 to 3000 and the molar ratio of x : y is 0.8 to 2.2.

4,886,552

METHOD FOR MONITORING THE REMOVAL OF A METALLIC CONTAMINANT FROM THE SURFACE OF A METALLIC ARTICLE

Mark R. Jaworowski, Enfield, and Gary A. Gruver, South Windsor, both of Conn., assignors to United Technologies Corporation, Hartford, Conn.

Filed Sep. 9, 1988, Ser. No. 242,759
Int. Cl.[4] C23G 1/02, 1/08, 1/10, 1/12
U.S. Cl. 134—27 15 Claims



1. A method for simultaneously removing and monitoring the removal of a contaminant from the surface of an workpiece, wherein the workpiece comprises a first metal and the contaminant comprises a second metal, comprising:

(a) immersing the workpiece and a reference electrode in an electrically conductive cleaning solution,

(b) periodically measuring the potential difference between the workpiece and the reference electrode to generate a series of successive potential difference values,

(c) quantifying fluctuations between successive potential difference values of the series to generate a noise parameter value,

(d) comparing the noise parameter value to a reference value, wherein the reference value is indicative of a maximum allowable amount of contaminant on the surface of the workpiece, to determine if an amount of contaminant greater than the maximum allowable amount of contaminant is present on the surface of the workpiece,

(e) removing the workpiece from the cleaning solution.

13. The method of claim 1 wherein during immersion of the workpiece in the cleaning solution the contaminant is converted to a product which is insoluble in the cleaning solution, additionally comprising:

(f) immersing the workpiece in a second solution, wherein the product is soluble, to dissolve the product,

(g) removing the workpiece from the second solution.

4,886,553

CLEANER FOR LITHOGRAPHIC PRINTING PLATES

Thomas N. Gillich, Whitehouse Station, N.J., assignor to Hoechst Celanese Corporation, Somerville, N.J.

Continuation of Ser. No. 56,028, Jun. 1, 1987, abandoned. This application Feb. 14, 1989, Ser. No. 311,377
Int. Cl.[4] B08B 3/08
U.S. Cl. 134—42 7 Claims

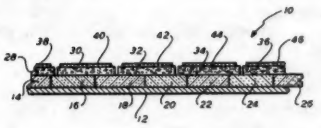
1. A method of cleaning a lithographic printing plate which comprises providing a metal based, imagewise exposed and developed lithographic printing plate having hydrophilic non-image areas and oleophilic imagle areas; and contacting both the image and the non-image areas witb a cleaner which is free of aromatic hydrocarbons consisting essentially of from about 3.0% to about 35.0% of a solvent component which is selected from the group consisting of ethoxylates and propoxylates of C_1 to C_4 alcohols; and from about 0.5% to about 7.0% sodium metasilicate; and from about 0.25% to about 6.0% of a non-ionic surfactant selected from the group consisting of polyoxy aryl ethers having a hydrophile-lipophile balance in the range of from about 10.5 to about 11.5; and from about 52.0% to about 96.25% water, wherein said percentages are by weight of the cleaner, whereby the non-image areas are desensitized and rendered non-receptive of greasy ink and wherein the image areas are not removed by said cleaner.

4,886,554

SOLAR ROOFING ASSEMBLY

William J. Woodring, Bound Brook, and Charles J. Horner, Jr., Piscataway, both of N.J., assignors to GAF Corporation, Wayne, N.J.

Filed Sep. 29, 1988, Ser. No. 250,588
Int. Cl.[4] H02N 6/00; H01L 25/02
U.S. Cl. 136—244 10 Claims



1. A solar roofing assembly comprising:

a roofing membrane;

a plurality of insulation blocks disposed as a layer on top of the roofing membrane;

a plurality of pavers disposed as a layer on top of the plurality of insulation blocks; and

a plurality of photovoltaic cells disposed as a layer on top of the plurality of pavers.

4,886,555

SOLAR CELL

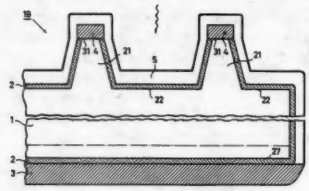
Karl-Gerhard Hackstein, Hanau, and Rudolf Hezel, Spardorf, both of Fed. Rep. of Germany, assignors to Nukem GmbH, Hanau, Fed. Rep. of Germany

Filed Mar. 31, 1988, Ser. No. 176,286

Claims priority, application Fed. Rep. of Germany, Apr. 13, 1987, 3712503

Int. Cl.[4] H01L *31/06*

U.S. Cl. 136—255 27 Claims



1. A solar cell comprising:

a semiconductive substrate having first and second opposed major surfaces in which minority and majority charge carriers are generated by radiation energy, said charge carriers being separable and so dischargeable by an electrical field,

ohmic contacts arranged at intervals upon said first semiconductive substrate surface, said contacts being interlinked with one another, and

a passivation layer arranged at least between said ohmic contacts, and wherein

the electrical field separating the minority and majority charge carriers exists in the vicinity of said second semiconductive substrate surface positioned opposite said first semiconductive surface carrying said ohmic contacts, so that the majority charge carriers diffuse to said ohmic contacts which collect said charge carriers,

said ohmic contacts are arranged in first areas on said first semiconductive substrate surface, said first areas being elevated with respect to second areas which are located between said ohmic contacts,

said ohmic contacts are in direct contact with said semiconductive substrate without shielding means, provided by doping said semiconductor substrate in its first surface region, for shielding against the minority charge carriers by a potential barrier,

said second areas do not have a potential barrier against minority charge carriers provided by doping of said semiconductor substrate in its first surface region, and

said ohmic contacts are covered by the passivation layer.

2. A solar cell according to claim 1, wherein the electrical field separating the minority and majority charge carriers is generated by MIS contacts formed on said second substrate surface, and wherein said MIS contacts are covered with an insulating lamina containing electrical charges.

4,886,556

METHOD FOR PRODUCTION OF SLIDING MEMBER

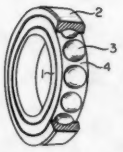
Shigeo Suzuki, Yokohama, and Kazuyuki Yasuda, Tokyo, both of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Continuation-in-part of Ser. No. 785,674, Oct. 9, 1985, abandoned. This application Jul. 14, 1986, Ser. No. 883,428

Claims priority, application Japan, Oct. 10, 1984, 59-212124

Int. Cl.[4] C04B *35/58*

U.S. Cl. 264—63 6 Claims



1. A method for the production of a rotating member used in a bearing, which comprises mixing silicon dioxide and carbon powder in an excess amount relative to the reaction equivalent weight thereof in conjunction with a small amount of a reaction catalyst selected from among silicon powder, silicon nitride, and silicon carbide powder; thermally reducing the resultant mixture in an atmosphere of nitrogen at a temperature in the range of 1,350° C. to 1,600° C.; mixing the resultant silicon nitride powder and 0.5 to 10% by weight of yttrium oxide and 0.1 to 10% by weight of aluminum oxide to thereby provide a silicon nitride mixture, further mixing said silicon nitride mixture and a binder and molding the resultant blend under pressure; calcining the resultant shaped article in an inert atmosphere under applied pressure at a temperature in the range of 1,400° C. to 1,600° C.; sintering the calcined shaped article at a temperature in the range of 1,600° C. to 1,800° C.; machining the resultant sintered article to the desired shape, and subjecting the machined article to a heat treatment at 800° C. to 1,200° C. for one to 100 hours in an oxidizing atmosphere.

4,886,557

MAGNESIUM ALLOY

Geoffrey A. Chadwick, Winchester 12 St. Giles Close Hampshire, England

Filed May 10, 1988, Ser. No. 192,271

Int. Cl.[4] C22F *1/06;* C22C *23/04*

U.S. Cl. 148—3 12 Claims

1. A magnesium alloy containing the following constituents by weight, apart from impurities:

zinc	11 to 25%
copper	0.5 to 5%
silicon	0.25 to 4%

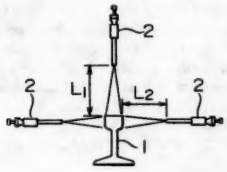
the balance being magnesium, and aluminium being substantially absent from the alloy.

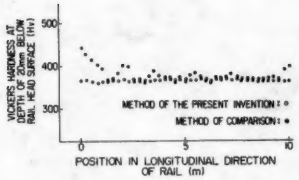
4,886,558

METHOD FOR HEAT-TREATING STEEL RAIL HEAD

Toyokazu Teramoto; Akio Fujibayashi; Kozo Fukuda; Mashiro Ueda; Shinichi Nagahashi; Yazuru Kataoka; Hiroaki Sato; Tsunemi Wada; Takao Gino; Yoshio Saito, and Kiyotaka Morioka, all of Tokyo, Japan, assignors to NKK Corporation, Tokyo, Japan

Filed May 20, 1988, Ser. No. 196,317
Claims priority, application Japan, May 28, 1987, 62-129885; May 29, 1987, 62-131754
Int. Cl.[4] C21D *9/04*
U.S. Cl. 148—146 2 Claims





1. In a method for heat-treating a steel rail head, which comprises:

heating a steel rail head to the austenization temperature; and then, continuously cooling said rail head so that the structure of a surface portion thereof transforms into a uniform and fine pearlite structure;

the improvement characterized by:

carrying out said cooling of said rail head by means of a hot water jet until a surface temperature of said rail head decreases to a temperature not below 420° C.; and then

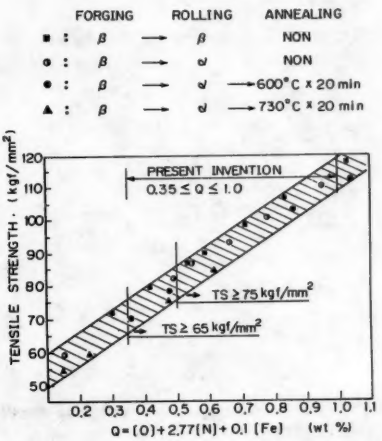
cooling said rail head by means of an air jet to at least the pearlite transformation temperature.

4,886,559

HIGH STRENGTH TITANIUM MATERIAL HAVING IMPROVED DUCTILITY

Takuji Shindo; Hiromitsu Naito, both of Sagamihara; Masayoshi Kondo, Tokyo; Takashi Fukuyama, Chigasaki; Masaaki Koizumi, Chigasaki, and Nobuo Fukada, Chigasaki, all of Japan, assignors to Nippon Steel Corporation and Toho Titanium Co., Ltd., both of Tokyo, Japan

Filed Sep. 1, 1988, Ser. No. 239,420
Claims priority, application Japan, Dec. 23, 1987, 63-326431
Int. Cl.[4] C22F *1/18*
U.S. Cl. 148—421 3 Claims


FORGING ROLLING ANNEALING
■ : β → β NON
○ : β → α NON
● : β → α → 600°C x 20 min
▲ : β → α → 730°C x 20 min
TENSILE STRENGTH · (kgf/mm²)
120
110
100
90
80
70
60
50
PRESENT INVENTION
0.35 ≤ Q ≤ 1.0
TS ≥ 75 kgf/mm²
TS ≥ 65 kgf/mm²
0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0 1.1
Q = [O] + 2.77[N] + 0.1 [Fe] (wt %)

1. A high strength titanium material having improved ductility, containing 0.1 to 0.8% by weight of iron, a required oxygen and nitrogen satisfying the following expression, in which an oxygen equivalence Q ranges from 0.35 to 1.0.

$$Q = [O] + 2.77\,[N] + 0.1\,[Fe]$$

wherein

[O] is an oxygen content % by weight

[N] is a nitrogen content % by weight

[Fe] is an iron content % by weight the rest being titanium and inevitable impurities, said oxygen and nitrogen existing as interstitial type solute elements in said titanium material, said titanium material exhibiting a two phase, an equiaxed phase or a lamellar phase, fine grain microstructure and having a tensile strength at least 65 kgf/mm^2.

4,886,560

IGNITION MODIFYING OVERCOAT FOR DETERRENT-COATED SMOKELESS PROPELLANT

Richard V. Cartwright, Sussex, N.J., assignor to Hercules Incorporated, Wilmington, Del.

Filed Dec. 28, 1988, Ser. No. 290,775
Int. Cl.[4] C06B *45/24*
U.S. Cl. 149—12 13 Claims

1. A method for improving ignition properties of deterrent-coated smokeless propellant comprising: applying to said deterrent-coated propellant an effective amount of an igniter component in the form of a composition comprising

(a) nitrocellulose (NC) base,

(b) liquid carrier,

(c) up to about 10% by dry propellant weight, of at least one inorganic oxidizer component, and

(d) a surfactant; and

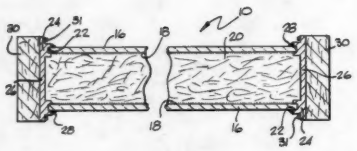
finishing the igniter composition-treated deterrent-coated propellant to obtain an overcoat comprising an igniter component on said propellant.

4,886,561

METHOD OF MAKING AN INSULATED WINDOW

Theodore R. Rohweder, and Richard J. Ray, Jr., both of Littleton, Colo., assignors to Manville Corporation, Denver, Colo.

Filed Jun. 16, 1988, Ser. No. 207,593
Int. Cl.[4] C03C *27/12*; B32B *17/12*
U.S. Cl. 156—102 **13 Claims**



1. A method of producing an insulated window product, comprising the steps of:

providing a layer of fibrous insulation having opposite faces, the layer permitting a predetermined amount of light to be transmitted therethrough;

adhering one face of the insulation layer to a sheet of glazing;

causing relative movement away from each other between the opposite face of the insulation layer and the sheet of glazing while maintaining the integrity of the insulation layer, to thereby increase the spacing between the sheet of glazing and the opposite face of the insulation layer; and

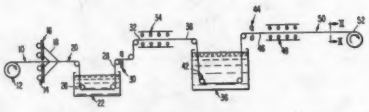
securing the sheet of glazing and the opposite face of the insulation layer in place to maintain the increased spacing therebetween.

4,886,562

METHOD OF MANUFACTURING REINFORCED OPTICAL FIBER

George T. Pinson, Huntsville, Ala., assignor to The Boeing Company, Wichita, Kans.

Filed Mar. 31, 1987, Ser. No. 32,242
Int. Cl.[4] G02B *6/22, 6/16*
U.S. Cl. 156—172 **16 Claims**



1. A method of manufacturing reinforced optical fiber comprising the steps of:

conveying an elongated optical fiber from a source;

symmetrically, coaxially winding reinforcing fiber to a selected density per unit length around said optical fiber to form a reinforcing-fiber covered optical fiber;

immersing said reinforcing-fiber covered optical fiber in an resin bath for a predetermined time to form a flexible resin matrix among said wound reinforcing fibers to form a resin-coated optical fiber;

passing said resin-coated optical fiber through a first sizing die to remove excess resin from and to shape the resin coating of said optical fiber to form a shaped resin-coated optical fiber;

passing said shaped resin-coated optical fiber through an oven to cure said resin to form a cured resin-coated optical fiber;

coating said cured resin-coated optical fiber with an external coating material to form a coated optical fiber;

passing said coated optical fiber through a second sizing die to shape and to remove excess external coating to form a reinforced optical fiber; and

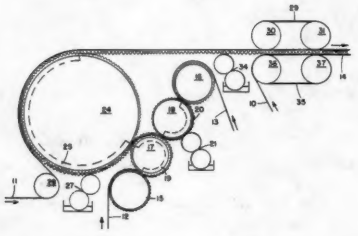
storing said reinforced optical fiber on a reel.

4,886,563

METHOD OF MAKING CORRUGATED PAPER BOARD

Peter G. Bennett, Kew; Peter R. McKinlay, Doncaster; Neil W. Shaw, Ivanhoe, and Ronald A. Stott, Kooyong, all of Australia, assignors to Amcor Limited, South Melbourne, Australia

Continuation-in-part of Ser. No. 902,160, Aug. 20, 1986, abandoned. This application Mar. 9, 1988, Ser. No. 165,764
Claims priority, application Australia, Sep. 4, 1985, PH02271
Int. Cl.[4] B31F *1/24, 1/28*
U.S. Cl. 156—205 **3 Claims**



1. A method of forming a corrugated structural paperboard panel comprising two outer layers of flat sheet and two inner fluted layers bonded together at the flute peaks which consists of:

(a) separately passing two strips of paperboard mediums over corrugating rollers to form two fluted layers having flute peaks;

(b) applying adhesive to said peaks of at least one of the two fluted layers;

(c) aligning fluted layers and bringing the flute peaks into flute tip to flute tip contact to adhere the two fluted layers together;

(d) maintaining the pitch of the adhered flutes and maintaining the flute tips to flute tips in contact until the adhesive has cured;

(e) and subsequently bonding two flat sheets to the fluted layers to form the two outer liners.

4,886,564

METHOD OF AND APPARATUS FOR APPLYING COATING MATERIAL TO A RUNNING SUBSTRATE

Ralph Pagendarm, Halstenbek, and Albert Hebels, Hamburg, both of Fed. Rep. of Germany, assignors to Pagendarm Beschichtungstechnik GmbH, Hamburg, Fed. Rep. of Germany

Filed Oct. 20, 1987, Ser. No. 111,403

Claims priority, application Fed. Rep. of Germany, Nov. 18, 1986, 3639487

Int. Cl.[4] B32B *3/14*

U.S. Cl. 156—230 22 Claims

1. A method of coating a continuously running substrate by means of a plurality of running webs, comprising the steps of applying to a first running web a layer of coating material which contains an evaporable solvent; thereafter heating the first web to thus expel at least some solvent from the layer of coating material; a first contacting step of contacting the layer of coating material on the first web with a flowing inert gas to gather the expelled solvent; transferring the thus dried layer from the first web onto the substrate; applying to an additional running web an additional layer of coating material which contains an evaporable solvent; heating the additional web to expel at least some solvent from the additional layer; a second contacting step of contacting the layer of coating material on the additional web with a discrete stream of an inert gas to gather the solvent which is expelled from coating material on the additional web; and transferring the additional layer onto the substrate so that one of the layers on the substrate overlies the other layer.

4,886,565

REACTIVE ION ETCHING APPARATUS

Mitsunobu Koshiba; Keiichi Yamada; Yoshiyuki Harita; Shin'ichi Kawamura, and Yuuji Furuto, all of Kanagawa, Japan, assignors to Japan Synthetic Rubber Co., Ltd., Tokyo, Japan

Filed Feb. 7, 1989, Ser. No. 307,280

Claims priority, application Japan, Feb. 10, 1988, 63-27657; Nov. 21, 1988, 63-292518

Int. Cl.[4] B44C *1/22;* H01L *21/306;* C03C *25/06;* B29C *37/00*

U.S. Cl. 156—345 10 Claims

1. A reactive ion etching apparatus comprising means for generating magnetic field parallel to the surface of a material to be etched; a negative electrode; supporting means mounted on said negative electrode for supporting the material to be etched; and means for cooling said negative electrode to a temperature of not more than 0° C.

4,886,566

MACHINE FOR FRANKING LABELS

Jacques Peyre, Paris, France, assignor to Societe anonyme dite: SMH Alcatel, Paris, France

Filed Jun. 6, 1988, Ser. No. 202,646

Claims priority, application France, Jun. 5, 1987, 87 07912

Int. Cl.[4] B32B *31/00*

U.S. Cl. 156—361 7 Claims

1. A franking machine for tickets which are cut off as and when required from a continuous tape in the form of long labels or short labels, as desired, the machine comprising:

a print drum and an associated backing roll;

a chute defining a guide path for the tape and/or the label up to the drum;

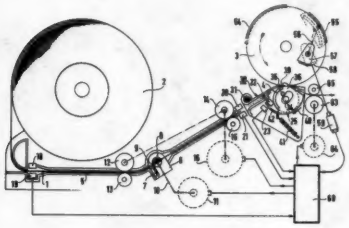
intermittent drive means for driving the tape and a cutter for cutting off labels, said cutter being interposed on the guide path;

first means and second means for positioning the tape respectively for cutting off a short label and for cutting off a long label, said first and second means being mounted downstream from the cutter, each at a distance therefrom which is substantially equal to the corresponding label length;

a control circuit coupled to said first means and said second means for controlling said drive means to drive the tape through the length of the desired label; and

a desired label length detector coupled to said control circuit for selecting said first means or said second means and for controlling the drive means depending on which of said first means and second means are selected;

said machine being characterized in that said second means associated with positioning the tape for cutting off a long label comprise a pivoting lever mounted beneath the drum and fitted opposite the drum with a feeler positioned in the path of and retracted by the end of the tape and/or short label arriving beneath the drum, a pair of detection cells



mounted offset from the print drum and the chute and coupled to said control circuit, and a shutter tab fixed to said lever and movable between said pair of cells so as to be interposed between the cells when said feeler is retracted, and effecting through said control circuit control the rotational drive of the print drum over a single turn thereby advancing each long and short label into position beneath said drum for synchronize printing thereon and otherwise to be outside said cells.

4,886,567

PLASTIC COMPOSITE BOTTLES AND METHOD AND APPARATUS FOR THEIR FABRICATION

Samuel S. Aidlin; Stephen H. Aidlin, and Larry Kincaid, all of Sarasota, Fla., assignors to Aidlin Automation Corp., Bradenton, Fla.

Filed May 12, 1988, Ser. No. 193,046

Int. Cl.[4] B29C *65/08*

U.S. Cl. 156—423 4 Claims

1. Apparatus for fabricating a composite plastic bottle by joining together a lower base cup component and an upper container component, such apparatus comprising:

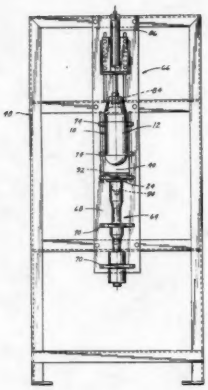
lower means for supporting the lower component is an upright orientation and for applying an upward force thereon from beneath the lower surface of the lower component;

upper means for supporting the upper component in an upright orientation and for applying a downward force thereon;

drive means to cause relative movement between the lower means and the upper means to urge the lower and upper components into contact with each other, such lower means being annular in shape over an extended radial distance whereby the upward force is applied to an annular area of the lower base cup component and the upper container component while said components are spaced

from each other radially interiorly of said lower means; and

electrical means for providing a flow of electrical current through the lower means while such lower means is in contact with the lower surface of the lower base cup



component, and while the upper surface of the lower component is in contact with the lower surface of the upper component to thereby weld together the upper component and the lower component for thereby forming the composite bottle.

4,886,568

ADJUSTABLE RADIUS WOOD LAMINATING FIXTURE

Robert E. Strozier, Atlanta, Ga., assignor to W. P. Stephens Lumber Company, Marietta, Ga.

Continuation-in-part of Ser. No. 150,635, Feb. 1, 1988. This application May 11, 1988, Ser. No. 193,252

Int. Cl.[4] B32B *31/00*

U.S. Cl. 156—443 **5 Claims**

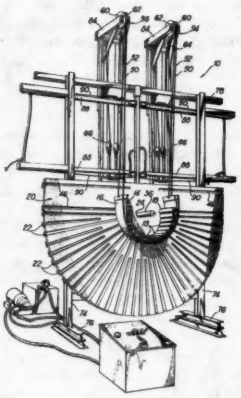
1. An adjustable wood laminating fixture for producing a plurality of shapes and sizes of curved wood forms from a plurality of wood laminations, comprising:

a. a metal bed having slots radially oriented about a central point,

b. a plurality of stanchions positionable on the bed by engaging the slots,

c. a measuring means rotatable about the bed central point to assist in locating stanchions at a predetermined radius from the central point,

d. an inner band which may be drawn against the stanchions to establish an inner laminating surface,



e. an outer band which may be drawn against a workpiece positioned between the inner and outer bands, which outer band forms an outer laminating surface, and

f. a means for pulling the band ends.

4,886,569

PLASMA ETCHING PROCESS

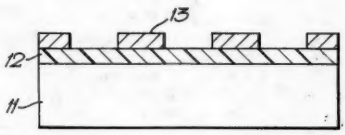
Sureshchandra M. Ojha, Harlow; Stephen R. Jennings, Bishop's Stortford, and Anthony D. Johnston, Harpenden, all of Great Britain, assignors to STC PLC, London, England

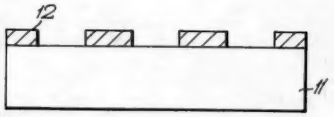
Filed Feb. 21, 1989, Ser. No. 313,377

Claims priority, application United Kingdom, Feb. 20, 1988, 8803996

Int. Cl.[4] H01L *21/306;* **B44C** *1/22;* **C03C** *15/00, 25/06*

U.S. Cl. 156—643 **4 Claims**





1. A process for selectively etching a polysilicon layer pro-

vided on a single crystal substrate, the method including masking the layer, exposing the unmasked regions of the layer to a first non-selective anisotropic plasma etch comprising sulphur hexafluoride (SF_6) containing at least 20 volume percent of oxygen whereby a major portion of exposed polysilicon is removed, exposing the structure to a second selective isotropic plasma etch comprising sulphur hexafluoride or a mixture of sulphur hexafluoride and a trace quantity of oxygen whereby the remaining polysilicon is removed without significant attack of the single crystal substrate.

4,886,570

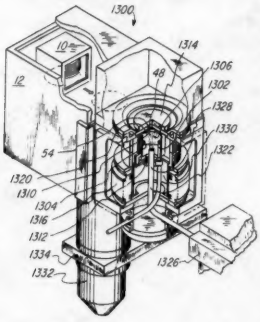
PROCESSING APPARATUS AND METHOD

Cecil J. Davis, Greenville; Robert T. Matthews; Lee M. Loewenstein, both of Plano; Rhett B. Jucha, Celeste; Randall C. Hildenbrand, Richardson, and John I. Jones, Plano, all of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Continuation of Ser. No. 74,113, Jul. 16, 1987, abandoned. This application Dec. 2, 1988, Ser. No. 282,993

Int. Cl.[4] B44C *1/22;* **C03C** *15/00;* **B05D** *3/06;* **C23C** *14/00*

U.S. Cl. 156—643 **40 Claims**



33. A method processing a workpiece in a process chamber comprising the steps of:

(a) introducing free radicals to the workpiece;

(b) coupling an energy source to the process chamber;

(c) independently controlling free radical and other particle concentrations and energies in said process chamber.

4,886,571

SURFACE TREATMENT AND APPARATUS THEREFOR

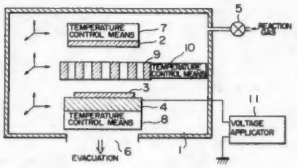
Keizo Suzuki, Kodaira; Susumu Hiraoka, and Shigeru Nishimatsu, both of Kokubunji, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Jan. 27, 1989, Ser. No. 302,334

Claims priority, application Japan, Feb. 24, 1988, 63-39386

Int. Cl.[4] B44C *1/22;* **H01L** *21/306;* **C23C** *14/00;* **B05D** *3/06*

U.S. Cl. 156—646 **32 Claims**



32. A method for surface treating a sample article with active particles formed by an activation surface, characterized in that the sample article to be surface treated and the activation surface for forming the active particles are maintained under a same atomsphere.

4,886,572

COMPOSITE ELECTRODE COMPRISING A BONDED BODY OF ALUMINUM AND ELECTROCONDUCTIVE POLYMER AND ELECTRIC CELL USING SUCH A COMPOSITE ELECTRODE

Okitoshi Kimura, Tokyo; Toshiyuki Kabata, Yokohama, and Toshiyuki Ohsawa, Kawasaki, all of Japan, assignors to Ricoh Company, Ltd., Tokyo, Japan

Filed Dec. 13, 1988, Ser. No. 283,605

Claims priority, application Japan, Dec. 14, 1987, 62-314165; Apr. 7, 1988, 63-83971; Nov. 28, 1988, 63-298253

Int. Cl.[4] C23F *1/00;* **B44C** *1/22;* **B23H** *3/00;* **C25B** *9/00*

U.S. Cl. 156—633 **13 Claims**

5. A method of applying a reduction treatment to electroconductive polymer in a bonded body of aluminum and said polymer, said aluminum having a surface to which said polymer is bonded, and mainly having (H00) face (H=1,2,4) as a crystal face at said surface, said method comprising contacting said polymer in an oxidized state with a reducing medium.

4,886,573

PROCESS FOR FORMING WIRING ON SUBSTRATE

Hiroshi Watanabe, Mito; Osamu Miura, Hitachi; Kunio Miyazaki, Hitachi; Shunichi Numata, Hitachi, and Kanji Otsuka, Higashiyamato, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

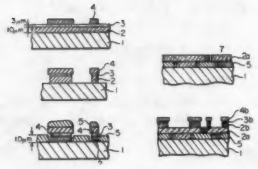
Filed Aug. 19, 1987, Ser. No. 87,021

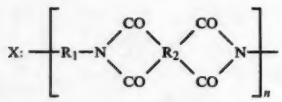
Claims priority, application Japan, Aug. 27, 1986, 61-200971

Int. Cl.[4] H01L *21/28*

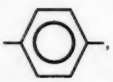
U.S. Cl. 156—643 **11 Claims**

1. A process for forming a wiring on a substrate which comprises a step of forming a lower lift-off film composed of polyimide-based resin having the unit structural formula X on a wiring substrate and then forming an upper lift-off film composed of polyimide-based resin having the following unit structural formula Y, a step of forming a mask for etching a desired pattern on the upper lift-off film, a step of patterning the upper lift-off film and the lower lift-off film along the pattern of the mask for etching, thereby exposing the surface of the substrate, a step of forming a wiring conductor material on the exposed surface of the substrate and the upper lift-off film by sputtering or vapor deposition and a step of lifting off the upper lift-off film from the lower lift-off film with an etching solution of a mixture of hydrazine and ethylene diamine:

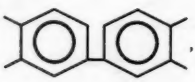




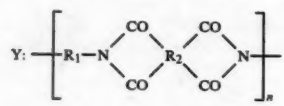
wherein R_1:



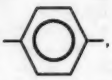
R_2:



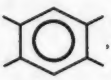
n is an integer of 15,000 to 30,000, and



wherein R_1:



R_2:



n is an integer of 15,000 to 30,000.

4,886,574

CITRUS JUICE CONCENTRATE PROCESSOR

Philip M. Grant, Norcross, Ga., assignor to APV Gaulin, Inc., Everett, Mass.

Filed May 10, 1987, Ser. No. 46,346
Int. Cl.[4] B01D *1/26*
U.S. Cl. 159—17.1 **14 Claims**

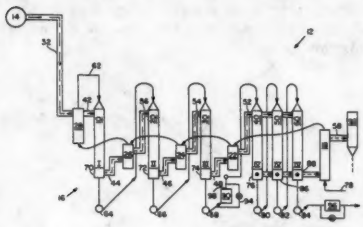
1. An apparatus for processing a juice comprising:
a multi-effect evaporator;
a series of stages serving as series of heat exchangers in said evaporator;
means for passing the juice with a pulp in said series of heat exchangers of said evaporator;
a heat source means for evaporating a liquid from the juice so as to form a juice concentrate; and
a homogenizer connected between the last two effects of said evaporator such that a juice concentrate of at least 65° Brix is formed at the output of the evaporator before being stored, said homogenizer reducing the viscosity of the juice concentrate to aid flow through the evaporator.

8. An apparatus for processing a juice comprising:
a multi-effect evaporator having a series of heat exchangers;

means for passing the juice to the series of heat exchangers of said evaporator;

a heat source means for evaporating a liquid from the juice so as to form a juice concentrate; and

a homogenizer positioned between a first part and a second part of the series of heat exchangers of said evaporator



such that partially concentrated juice which has been passed through the first part of the series is reduced in viscosity before being passed through the second part of the series of heat exchangers, liquid being further evaporated from the juice concentrate in the second part of the series in an amount such that the juice concentrate achieves a Brix level of about 65° Brix and greater.

4,886,575

DETACKIFICATION OF ADHESIVE MATERIALS CONTAINED IN SECONDARY FIBER WITH POLYVINYL ALCOHOL

Robert D. Moreland, Jacksonville, Fla., assignor to Betz Laboratories, Inc., Trevose, Pa.

Filed Oct. 8, 1985, Ser. No. 785,420

The portion of the term of this patent subsequent to May 17, 2005, has been disclaimed.

Int. Cl.[4] D21C *5/02, 9/08*

U.S. Cl. 162—5 **22 Claims**

1. A method of inhibiting the deposition and adherency of hot melt and/or pressure sensitive adhesive materials on the surfaces of repulping equipment during the repulping of waste paper and paper products containing such which consists essentially of repulping said waste paper or paper products in the presence of a sufficient amount for the purpose and in the range of about 0.5 to about 30 ppm of a polymer consisting essentially of moieties of vinyl alcohol, which polymer contains at least some hydrophobic groupings and is water-soluble.

4,886,576

METHOD AND APPARATUS FOR PRODUCING UNIFORM PULP YIELDS BY CONTROLLING THE OPERATION OF A REFINER

Tod H. Sloan, Battle Ground, Wash., assignor to Boise Cascade Corporation, Boise, Id.

Filed Dec. 16, 1987, Ser. No. 134,209

Int. Cl.[4] D21B *1/14;* **D21C** *7/12;* **D21D** *1/30*

U.S. Cl. 162—49 **16 Claims**

1. Apparatus for producing a uniform pulp yield from a given quantity of wood chips, comprising:

(a) digester means for cooking the wood chips in a cooking liquor to produce cooked wood chips from which the lignin has been at least partially removed and dissolved in the cooking liquor;

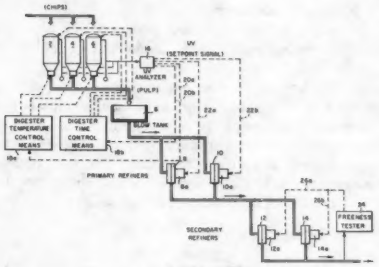
(b) refiner means for refining the cooked wood chips to produce wood pulp fibers therefrom;

(c) UV analyzer means for measuring the UV absorbance of the lignin dissolved in the cooking liquor; and

(d) control means responsive to said UV analyzer means for controlling the operation of at least the refiner means as a function of the UV absorbance of the lignin dissolved in said cooking liquor, thereby to cause the pulp fibers to meet a given standard of uniformity.

12. The method of producing a uniform pulp yield from a given quantity of wood chips, comprising the steps of:

(a) cooking the wood chips in a cooking liquor in a digester to produce cooked wood chips from which the lignin has been at least partially removed and dissolved in the cooking liquor;



(b) refining the cooked wood chips in a first refiner to mechanically break down the wood chips into pulp fibers;

(c) measuring the UV absorbance of the cooking liquor to determine the amount of lignin dissolved therein; and

(d) controlling the operation of the first refiner as a function of the ultraviolet energy absorbance characteristic of the liquor in which the lignin is dissolved, thereby to cause the resultant wood pulp to meet a given standard of uniformity.

4,886,577

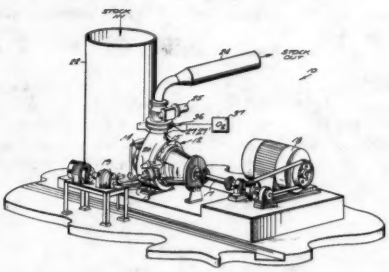
METHOD AND APPARATUS FOR MIXING OXYGEN GAS WITH MEDIUM CONSISTENCY PULP IN A PUMP DISCHARGE

William E. Wiley, Glens Falls, N.Y., assignor to Kamyr, Inc., Glens Falls, N.Y.

Filed May 3, 1985, Ser. No. 730,171

Int. Cl.[4] D21C *9/147;* **D21D** *5/26*

U.S. Cl. 162—52 **3 Claims**



1. A method of effecting oxygen delignification of a finely comminuted cellulosic fibrous material in a slurry having a consistency of about 6–18% comprising the steps of:

(a) adding caustic to the slurry;

(b) simultaneously fluidizing and degassing the slurry while centrifugally pumping the slurry, utilizing a fluidizing centrifugal pump having a vacuum system, the pump including a housing having a slurry outlet; and

(c) immediately after step (b), adding oxygen gas to the slurry, to effect oxygen delignification of the slurry material, by providing a plate having a central opening concentric with said housing outlet, and having at least one gen-

erally radially extending bore therein communicating at one end thereof with the central opening; and introducing oxygen gas under pressure into the bore to thereby pass into the slurry flowing through the central opening.

2. A system for facilitating oxygen delignification of finely comminuted cellulosic fibrous material in a slurry, comprising:

a vessel containing the slurry;

a fluidizing centrifugal pump having a housing with a slurry inlet and slurry outlet, said slurry inlet being operatively connected to said vessel;

a vacuum system for degassing the slurry as it is pumped by said fluidizing centrifugal pump from said inlet to said outlet; and

means for mixing oxygen gas into the slurry, said means consisting of means for introducing oxygen gas into the slurry as it is flowing out of said pump outlet, comprising: a shear plate affixed to said housing and having a central opening substantially concentric with said outlet, and means for introducing oxygen gas into the slurry flowing through said plate central opening.

4,886,578

HIGH HEAT RESISTANT OIL-IMPREGNATABLE ELECTRICAL INSULATING BOARD

Gary L. Hendren, Richmond, Va.; Richard L. Provost, Kennett Square, Pa.; Kim L. Fried, East Burke, and Leland A. Taylor, Lyndon, both of Vt., assignors to E. I. Du Pont De Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. No. 100,738, Sep. 24, 1987, abandoned. This application Aug. 30, 1988, Ser. No. 238,441

Int. Cl.[4] D21H *1/02, 5/12*

U.S. Cl. 162—123 **8 Claims**

1. A heat-resistant oil-impregnatable insulating board comprising 35–60 wt. % aromatic polyamide fibrous materials and 40–65 wt. % polytetrafluoroethylene fibrous materials substantially free of hydrogen-containing carbonaceous matter and characterized by an average break strength of at least 500 kN/m width, a dielectric constant of less than 2.7 and an average dissipation factor in oil of less than 0.01.

4,886,579

ADHESIVE MATERIAL FOR CREPING OF FIBROUS WEBS

James W. Clark, Wallingford, and Chauncey C. De Pugh, Media, both of Pa., assignors to Scott Paper Company, Philadelphia, Pa.

Filed Apr. 29, 1988, Ser. No. 187,752

Int. Cl.[4] D21H *5/24*

U.S. Cl. 162—111 **8 Claims**

1. In a method of creping a fibrous web wherein the creping adhesive is applied to the fibrous web before it contacts the creping surface, the improvement consisting of applying a creping adhesive which comprises at least 10% by weight of the total solids content of said formulation of a polymer or copolymer having a Tg greater than 50° C.

4,886,580

DRY QUENCHING COKE BOX

Edward S. Kress, Brimfield, and Gene Carpenter, Galesburg, both of Ill., assignors to Kress Corporation, Brimfield, Ill.

Continuation-in-part of Ser. No. 41,876, Apr. 22, 1987, abandoned. This application Apr. 22, 1988, Ser. No. 185,089

Int. Cl.[4] C10B *39/02, 39/12, 39/14*

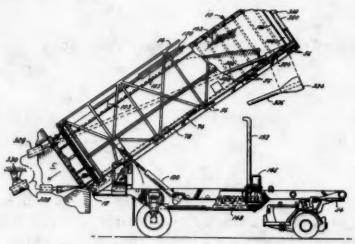
U.S. Cl. 202—228 **10 Claims**

1. A coke box for dry quenching a charge of coke from a coke oven comprising, in combination

a chamber for receiving a charge of coke, said chamber formed of metal panels having an exterior surface, and an interior shape and a volume in substantially the form of a rectangular parallelepiped substantially equal to that of the shape and volume of the charge of coke, the receiving chamber having a top, a bottom, and opposite sides, a rear end and a door opening,

door means for selectively closing the door opening to enclose the coke within the coke box to substantially isolate the coke from the atmosphere and external cooling media,

means for cooling the exterior surface of the receiving chamber to indirectly cool the charge of coke by cascading water from an upper reservoir located at the top of the coke box, over the exterior of the panels, and into a lower collection trough,



means for supporting the panels without rigid interconnection therewith,

means for creating an effective seal between the coke oven and the receiving chamber to prevent particulate matter from escaping,

and means for circulating gas present within the receiving chamber to enhance the transfer of heat from the coke to the panels of the receiving chamber.

4,886,581

REMOVAL OF HYDROGEN FLUORIDE FROM 2,2,3,3-TETRA-FLUOROOXETANE

Yohnosuke Ohsaka; Shoji Takaki, both of Osaka, and Hiroo Sakai, Takarazuka, all of Japan, assignors to Daikin Industries Ltd., Osaka, Japan

Filed Jul. 1, 1987, Ser. No. 68,935

Claims priority, application Japan, Jul. 3, 1986, 61-157701

Int. Cl.[4] B01D *3/00*

U.S. Cl. 203—80 **4 Claims**

1. A process for removing hydrogen fluoride from 2,2,3,3-tetrafluorooxetane comprising extracting hydrogen fluoride from 2,2,3,3-tetrafluorooxetane with a halogenated hydrocarbon selected from the group consisting of trichloroethylene, tetrachloroethane, 1,1,1-trifluorotrichloroethane, 1,1,2-trifluorotrichloroethane, 1,2-difluorotetrachloroethane, methylchloroform, tetrachloroethylene, p-chlorotoluene, p-chlorobenzotrifluoride, 3,4-dichlorobenzotrifluoride and mixtures thereof to obtain a first mixture of 2,2,3,3-tetrafluorooxetane and the halogenated hydrocarbon containing 0.1 to 1.0% by weight of hydrogen fluoride; subjecting said first mixture to a first distillation at a temperature of 40°–80° C. and a pressure between atmospheric pressure and 5 kg/cm^{2}G to obtain a bottom mixture comprised of a second mixture of 2,2,3,3-tetrafluorooxetane and the halogenated hydrocarbon containing less than 500 ppm of hydrocarbon fluoride and subjecting said bottom mixture to a second distillation at a temperature of 30°–70° C. and a pressure between atmospheric pressure and 5 kg/cm^{2}G to recover an azeotropic mixture of 2,2,3,3-tetrafluorooxetane and the halogenated hydrocarbon containing substantially no hydrogen fluoride.

4,886,582

RESID HYDROPROCESSING CATALYST AND METHOD OF PREPARATION

Howard D. Simpson, Irvine, Calif., assignor to Union Oil Company of California, Los Angeles, Calif.

Filed Jun. 29, 1988, Ser. No. 213,079
Int. Cl.[4] B01J *23/85, 23/88, 27/185, 27/188*
U.S. Cl. 502—211 46 Claims

1. A catalytic composition comprising at least one metal hydrogenation component comprising Group VIB or Group VIII metal components supported on the amorphous, porous refractory oxide, said composition comprising less than 15 weight percent of said metal hydrogenation component, calculated as the trioixide, and having a pore size distribution wherein at least 75 percent of the total pore volume is in pores of diameter from about 20 angstroms below the mode pore diameter to about 20 angstroms above the mode pore diameter, less than 10 percent of said total pore volume is in pores of diameter less than 60 angstroms and greater than 3 percent to less than 10 percent of said total pore volume is in pores of diameter greater than 110 angstroms, said mode pore diameter of said composition is in the range from about 70 to about 90 angstroms.

4,886,583

FORMATION OF PROTECTIVE COATINGS BY ELECTROLYTIC CODEPOSITION OF A NICKEL-COBALT MATRIX AND CERAMIC PARTICLES

Robert L. Martinou, Bry sur Marne, and Michel M. Ruimi, Paris, both of France, assignors to Societe Nationale d'Etude et de Construction de Moteurs d'Aviation "S.N.E.C.M.A.", Paris, France

Filed Jun. 30, 1988, Ser. No. 213,910
Claims priority, application France, Jul. 1, 1987, 87 09289
Int. Cl.[4] C25D *15/00*
U.S. Cl. 204—16 18 Claims

1. A method of protecting an alloyed steel or nickel-based superalloy substrate against oxidation and frictional wear at temperatures below 600° C., comprising the steps of:

providing a sulfamate bath having a Ni and Co metallic salts content of from 70 g/l to 100 g/l and a Ni/Co mass ratio of from 5 to 33, said bath containing from 50 g/l to 300 g/l of ceramic particles in suspension, said ceramic particles being selected from the group consisting of SiC, Al_2O_3 and Cr_2O_3; and

subjecting said substrate to electrolysis in said sulfamate bath to provide said substrate with a protective coating by electrolytic codeposition of a binary nickel-cobalt matrix including an homogeneous dispersion of said ceramic particles wherein the content of said ceramic particles in said coating is from 3.5% to 10% by mass.

4,886,584

POTENTIAL MEASURING METHOD AND APPARATUS HAVING SIGNAL AMPLIFYING MULTIPLE MEMBRANE ELECTRODE

Kuang L. Cheng, Kansas City, Mo., assignor to Solar Scientific, Inc., Kansas City, Mo.

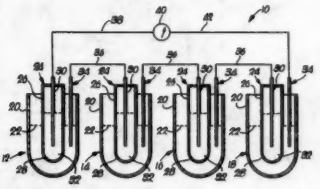
Filed Jun. 27, 1988, Ser. No. 212,051
Int. Cl.[4] G01N *27/30*
U.S. Cl. 204—1 T 20 Claims

1. A multiple membrane electrode device for amplifying the signal potential directed to a potential measuring apparatus, said device comprising:

a plurality of ion selective potential sensing electrodes each having a potential sensing membrane which is functional as a capacitor;

means for receiving a quantity of liquid solution to be tested for the ionic concentration thereof, said receiving means including a plurality of separate solution receiving compartments, each isolating the solution received therein from electrical contact with solution received in the other solution receiving compartments, there being a separate solution receiving compartment for each of the sensing electrodes, each of the sensing electrodes being disposed with the membrane thereof in a position adapted to be in contact with a quantity of the test solution received in a corresponding solution receiving compartment;

an electrically conductive element associated with each of the sensing electrodes, each element being disposed to be



in electrical contacting relationship with the liquid test solution in a respective compartment;

means for electrically coupling the sensing electrodes and the elements in electrical series relationship; and

means for connecting one of the sensing electrodes and one of the elements to the potential measuring apparatus.

20. A method of amplifying a potentiometrically measured ionic concentration signal comprising the steps of:

providing separate quantities of a liquid solution to be tested for the ionic concentration thereof, wherein each of said separate quantities of liquid solution are electrically isolated from one another;

measuring the potentiometric value of each of the separate electrically isolated test solutions; and

directing the current from each separate test solution in electrical series relationship to a potential measuring apparatus.

4,886,585

ELECTROLYTIC PROCESS FOR APPLYING THIN SILVER COATINGS TO STAINLESS STEEL, PARTICULARLY IN BEARING RACES

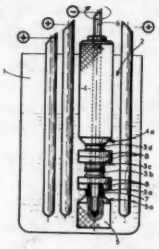
Robert L. Martinou, Bry sur Marne, and Michel M. Ruimi, Paris, both of France, assignors to Societe Nationale d'Etude et de Construction de Moteurs d'Aviation "S.N.E.C.M.A.", Paris, France

Filed Nov. 4, 1988, Ser. No. 267,273
Claims priority, application France, Nov. 5, 1987, 87 15338
Int. Cl.[4] C25D *5/34, 5/48*
U.S. Cl. 204—23 15 Claims

1. A process for the electrolytic application of a thin silver coating layer of a thickness between 0.8 and 1.8 microns on a stainless steel part having a hardness of at least 58 HRc and a

low deformation tendency, said process comprising subjecting said parts to the following successive steps:

(a) degreasing in a solvent bath;
(b) anodic electrolytic degreasing in an alkaline atmosphere;
(c) anodic electrolytic attack in an acid atmosphere;
(d) an intermediate step of additional preparation consisting of wood prenickeling;
(e) electrolytic neutralization;



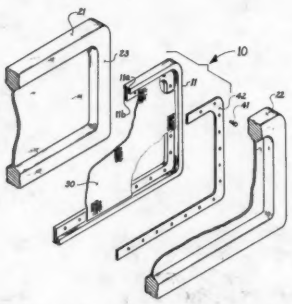
(f) electrolytic presilvering in a presilvering bath containing silver cyanide (Ag CN), potassium cyanide (KCN), and potassium carbonate (K_2CO_3) in proportions such that the free KCN/metal Ag ratio is greater than 15; and,
(g) electrolytic silvering proper in a silvering bath containing silver cyanide, potassium cyanide, potassium carbonate, and potash in proportions such that the free KCN/metal Ag ratio of the silvering bath is about 10 times lower than that of the presilvering bath.

4,886,586

COMBINATION ELECTROLYSIS CELL SEAL MEMBER AND MEMBRANE TENTERING MEANS FOR A FILTER PRESS TYPE ELECTROLYTIC CELL

Gregory J. E. Morris, Milan, Italy, assignor to The Dow Chemical Company, Midland, Mich.

Filed Sep. 26, 1988, Ser. No. 249,140
Int. Cl.[4] C25B *1/26, 9/00, 13/02*
U.S. Cl. 204—128 **13 Claims**



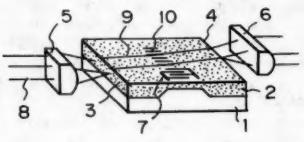
13. A method of operating an electrolytic cell comprising:
(a) providing a seal/tentering member including a solid body structure in a picture frame type configuration comprising a first generally rectangular portion integral with a second generally rectangular flange portion of a size smaller than the first portion forming a "P-shaped" member when viewed in cross section, said first portion adapted for providing a seal between two planar frame members, said second flange portion adapted for tentering a separator member thereon, the first portion generally rectangular in cross section, having parallel top and bottom walls and first and second vertical parallel side walls, and a second flange portion integral with the first portion generally rectangular in cross section having a top and bottom wall and first and second parallel side walls, said second portion having top and bottom walls of a smaller length to form a "P-shaped" parameter viewed in cross section, said bottom of first portion and top of second portion being a contiguous boundary and said first side wall of said second portion and said first side wall of said first portion is substantially the same wall, the second sidewall of the second portion adapted for tentering a separator;
(b) attaching a sheet-like separator in the second sidewall of the second portion of the seal/tentering member;
(c) interposing the seal/tentering member with separator between at least a first frame member and a second frame member, the separator spacing apart an anode and a cathode compartments defined by the first and second frame members and the separator;
(d) compressing the seal/tentering member with separator and the first and second frame members together;
(e) feeding an aqueous alkali metal halide solution to the electrolytic cell; and
(f) passing an electrical current from the anode to the cathode such that a halide is evolved at the anode.

4,886,587

METHOD OF PRODUCING THIN FILM OPTICAL ELEMENT BY ION INJECTION UNDER ELECTRIC FIELD

Mamoru Miyawaki, Tokyo, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Division of Ser. No. 774,579, Sep. 10, 1985, Pat. No. 4,778,236. This application Jun. 6, 1988, Ser. No. 202,889
Claims priority, application Japan, Sep. 14, 1984, 59-192901; Sep. 14, 1984, 59-192902; Sep. 14, 1984, 59-192903; Sep. 14, 1984, 59-192905; Sep. 14, 1984, 59-192906; Sep. 14, 1984, 59-192907; Sep. 14, 1984, 59-12908; Sep. 14, 1984, 12909; Sep. 14, 1984, 59-192910; Sep. 14, 1984, 59-192911; Aug. 29, 1985, 60-190449; Aug. 29, 1985, 60-190450; Aug. 29, 1985, 60-190451; Aug. 29, 1985, 60-190452; Aug. 29, 1985, 60-190453
Int. Cl.[4] C25F *5/00*
U.S. Cl. 204—130 **32 Claims**



1. A method for producing a thin film optical element comprising the steps of:
injecting ions into the surface of a substrate only in an area close to the end thereof;
injecting ions into the entire surface of said substrate;
thermally diffusing thus injected ions; and
forming electrodes in a part of said substrate other than the area close to the end thereof.

4,886,588

ELECTROLYTIC METHOD OF AND BATH FOR STRIPPING COATING FROM ALUMINUM BASES

Paul D. Curfman, Alvin, assignor to Union Carbide Corporation, Danbury, Conn.

Filed Apr. 10, 1989, Ser. No. 335,497
Int. Cl.[4] C25F *5/00*
U.S. Cl. 204—146 **14 Claims**

1. A method of electrolytically stripping a coating from an aluminum base material comprising the steps:

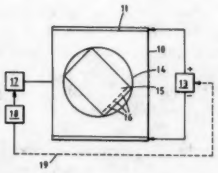
(a) preparing an electrolytic solution comprising 0.02 to 2.00 mole percent of a soluble salt of a hydroxy organic acid, 2.5 to 5.5 mole percent of an alkali metal carbonate; 0.0004 to 0.04 mole percent of an aluminum corrosion inhibitor; and water;
(b) heating said electrolytic solution;
(c) immersing a coated aluminum base material into said heated electrolytic solution; and
(d) using the coated aluminum base material as an anode and with a cathode contacting said electrolytic solution, passing an electric current through said electrolytic solution for a time period sufficient to strip the coating from the aluminum base material without damaging the aluminum base material.

4,886,589

ELECTROPHORESIS METHOD AND APPARATUS FOR SEPARATING PARTICLES IN A SEPARATION MEDIUM

Edwin Southern, Oxford, England, assignor to The Chancellor, Masters and Scholars of the University of Oxford, Oxford, England

PCT No. PCT/GB86/00578, § 371 Date May 28, 1987, § 102(e) Date May 28, 1987, PCT Pub. No. WO87/02133, PCT Pub. Date Apr. 9, 1987
PCT Filed Sep. 29, 1986, Ser. No. 57,972
Claims priority, application Sweden, Sep. 30, 1985, 8504506
Int. Cl.[4] G01N *27/26*; B01D *57/02*
U.S. Cl. 204—182.8 **16 Claims**



1. An electrophoresis method for separating particles in a separation medium, wherein the method comprises (a) creating an electric field, (b) effecting relative rotation between the separation medium and the electric field at predetermined intervals in a plane between different rotary positions and wherein the angle between the rotary positions is larger than 90°, and (c) allowing the particles to be driven in different directions in the separation medium by the electric field, whereby the particles are separated in the separation medium by virtue of their being driven in said different directions therein.

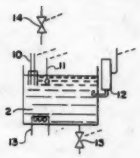
4,886,590

CHEMICAL PROCESS CONTROL SYSTEM

Douglas L. Tittle, Willoughby, Ohio, assignor to Man-Gill Chemical Company, Cleveland, Ohio

Filed Nov. 2, 1987, Ser. No. 116,479
Int. Cl.[4] C25D *21/14, 17/00*; G05D *9/00*
U.S. Cl. 204—232 **25 Claims**

1. An apparatus for chemical bath process control comprising:
a plurality of sensor means, each of said sensor means for sensing at least one parameter of a bath;
means for interrogating each of said sensor means to determine its said sensed parameter;
means for determining at least one characteristic of said bath from said sensed parameters;
means for comparing said characteristics to established, respective operating limits;
means for initiating a corrective response when a characteristic falls outside its said operating limits, said means for interrogating, for determining, for comparing and for initiating comprising a computer; and



communication means for transmitting said sensed parameters and/or bath characteristics to a remote location and for transmitting instructions from said remote location to said computer.

4,886,591

PHOSPHATE BONDED COMPOSITE ELECTRODES

Jean-Marc Lalancette; Hugues Menard, and Estelle Potvin, all of Sherbrooke, Canada, assignors to Universite De Sherbrooke, Sherbrooke, Canada

Filed Aug. 4, 1988, Ser. No. 228,328
Int. Cl.[4] C25B *11/04*
U.S. Cl. 204—291 **5 Claims**

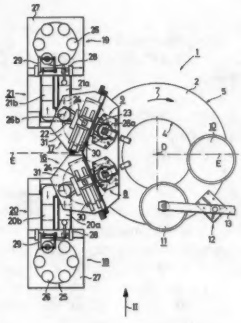
1. A pressure-molded, rigid, high surface cathodic or anodic electrode of low electrical resistance and good mechanical strength and resistance to corrosion comprising non-dissolving, electrically-conducting metal particles of high specific surfaces and fractal structure which are bound with from 2 to 15% by weight of aluminum phosphate.

4,886,592

APPARATUS ON THE CAROUSEL PRINCIPLE FOR COATING SUBSTRATES

Friedrich Anderle, Hanau am Main; Dan L. Costescu, Hainburg; Stefan Kempf, Alzenau; Emmerich Novak, Obertshausen, and Jaroslav Zejda, Rodenbach, all of Fed. Rep. of Germany, assignors to Leybold Aktiengesellschaft, Cologne, Fed. Rep. of Germany

Filed May 20, 1988, Ser. No. 196,724
Claims priority, application Fed. Rep. of Germany, Oct. 17, 1987, 3735284
Int. Cl.[4] C23C *14/56*
U.S. Cl. 204—298 **14 Claims**



1. Apparatus according to the carousel principle for the coating of substrates, with a vacuum chamber and a rotatable substrate holder disposed therein, which has in equidistant distribution and in circular arrangement a plurality of substrate pickups, adjacent pickups being angularly separated by a pitch

angle, said holder being and is transportable step-wise by means of a drive on a circular path from an air lock station through at least one coating station to an air lock station, characterized in that the vacuum chamber (1) has, in the circumferential direction of the rotatable substrate holder (6), two air lock stations (8, 9) and two coating stations (10, 11), one behind the other in each case, and that the stepping width of the drive (36) on the one hand, and, on the other hand, the angular position of each coating station (10 and 11, respectively) to the air lock station (8 or 9, respectively) associated with it, are selected in reference to the axis of rotation of the substrate holder (6) such that one and the same coating station (10 and 11, respectively) is associated, via the step-wise movement of a particular substrate pickup (63), with one and the same air lock station (8 and 9, respectively).

14. Apparatus according to claim 1, characterized in that the coating station (10, 11) has a cathode chamber (77, 73) disposed on the vacuum chamber (1), with a sputtering cathode (67) with a target (68), whose sputtering surface (68*a*) faces the substrate holder (6), that between the target and the substrate holder a mask holder (76) with a mask (80) is disposed, and that underneath the vacuum chamber (1) a lifting means (77) is disposed, with a lift rod (78) sealingly penetrating the chamber floor (3), by which the substrate (26) can be pressed by means of the substrate pickup concentrically against the mask (80).

4,886,593

DEVICE FOR DESTROYING BACTERIA

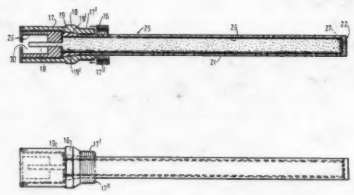
Robert W. Gibbs, 6 Verbena Avenue, Toronto, Ontario, Canada M1S 1K1

Continuation of Ser. No. 92,568, Sep. 3, 1987, abandoned. This application Feb. 24, 1989, Ser. No. 314,980

Claims priority, application United Kingdom, Sep. 11, 1986, 8621948

Int. Cl.[4] A61L *2/00*

U.S. Cl. 204—302 **14 Claims**



1. A device for electrostatically killing or treating bacteria or other microorganisms in water by subjecting the water to an electrostatic effect to kill or inhibit the growth of bacteria, comprising:

a mounting means mountable on the exterior of a means for containing flowing water; said mounting means and, in use, said water containing means, having passage means for communicating with the interior of said means for containing water with said passage means of said mounting means having a first end to be located adjacent said means for containing water and a second end to be located remote from said means containing water;

an elongate tubular housing of rigid electrically insulating material having two ends, and being permanently closed at a first end by being of integral formation or by having a closure member fixedly welded or bonded thereto, and the second end of the tubular housing being open and having integral securement means for securement in the passage means in said mounting means so that, in use, the first end of the housing extends in cantilever manner into said means for containing water, said tubular housing being insertable into and removable from said mounting means only via said second end of said mounting means normally remote from the water containing means; and

an electrode removably insertable into and removable from said elongate tubular housing only via said second open end of said housing and extending from within said mounting means towards said closed, first end of the tubular housing, said electrode having terminal means for connection to a high voltage source which is also connectable to the means for containing water so as to provide an electrostatic field in the water.

4,886,594

HYDROTREATING CATALYST AND PROCESS

Jeffrey T. Miller, Naperville, Ill., assignor to Amoco Corporation, Chicago, Ill.

Continuation of Ser. No. 543,379, Oct. 19, 1983, abandoned, which is a continuation-in-part of Ser. No. 447,444, Dec. 6, 1982, abandoned. This application Aug. 28, 1987, Ser. No. 90,654

Int. Cl.[4] C10G *45/00*

U.S. Cl. 208—210 **15 Claims**

1. A process for hydrotreating a feedstock consisting essentially of a whole shale oil wherein the feedstock contains at least one component selected from the group consisting of sulfur, nitrogen and metals, wherein said process comprises contacting the feedstock with hydrogen under hydrotreating conditions and in the presence of a catalyst comprising a hydrogenating component consisting essentially of (1) at least one Group VIB metal component and (2) a phosphorus component, deposed on the surface of a support component comprising a porous refractory inorganic oxide and free of a zeolite component.

7. A process for the hydrodemetallation and hydrodesulfurization of a hydrocarbon feedstock containing asphaltenes and a substantial amount of metals, said feedstock consisting essentially of a whole shale oil which process comprises:

(a) contacting said feedstock in a first reaction zone with hydrogen and a first-stage catalyst comprising (1) a hydrogenation metal component comprising at least one member selected from the group consisting of Group VIB metals and Group VIII metals, and (2) a porous inorganic oxide support, said hydrogenation metal being in at least one form selected from the group consisting of the elemental form, the oxide, and the sulfide, and said catalyst having a surface area of about 100 m^2/gm to about 400 m^2/gm, a pore volume of about 0.7 cc/gm to about 1.7 cc/gm, and an average pore diameter of about 125Å to about 350Å; and

(b) contacting the effluent from the first reaction zone in a second reaction zone with a second-stage catalyst comprising a hydrogenating component consisting essentially of (1) a metal component in which the metal is selected from Group VIB and (2) a phosphorus component, deposed on the surface of a support comprising a porous refractory inorganic zeolite component, and having a pore volume within the range of about 0.4 cc/gm to about 0.9 cc/gm, a surface area within the range of about 130 m^2/gm to about 300 m^2/gm, an average pore diameter within the range of about 90 Å to about 160 Å, and a pore volume distribution such that less than about 40% of its total pores volume is in pores having diameters within the range of about 50 Å to about 80 Å, about 45% to about 90% of its total pore volume is in pores having diameters within the range of about 80 Å to about 130 Å, and less than about 15% of its total pore volume is in pores having diameters greater than 130 Å.

4,886,595

PROCESS OF FROTH FLOTATION USING A METHYLENE BISXANTHATE AS A COLLECTOR REAGENT

Eugenio A. Saphores Wiedmaier; Arturo G. Gleisner Klempau, both of Vina del Mar; Juan C. Vega de Kuyper, and Wladimir A. Mardones Parra, both of Santiago, all of Chile, assignors to Establecimientos Industrales Quimicos Oxiquim S.A., Chile

Filed Apr. 28, 1989, Ser. No. 344,913
Int. Cl.[4] B03D *1/02*
U.S. Cl. 209—166 12 Claims

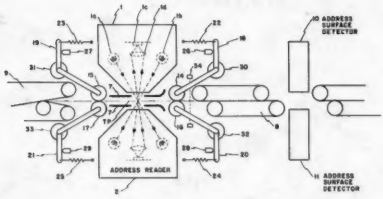
1. A process of froth flotation for the recovery of a sulfide mineral, or a sulfidized oxide mineral, from an ore containing said sulfide mineral or sulfidized oxide mineral, comprising subjecting said ore in the form of an aqueous pulp to froth flotation in the presence of a sufficient amount of methylene bisxanthate to act as a collector reagent for said sulfide mineral or sulfidized oxide mineral.

4,886,596

ADDRESS READING APPARATUS FOR MAIL ARTICLE

Tsutomu Sasage, and Masahiko Noguchi, both of Tokyo, Japan, assignors to NEC Corporation, Japan

Filed Oct. 19, 1987, Ser. No. 110,114
Claims priority, application Japan, Oct. 21, 1986, 61-251017
Int. Cl.[4] B07C *1/18, 3/14*
U.S. Cl. 209—539 8 Claims



1. An apparatus for reading information on a flat article, the apparatus comprising:

a transfer path for transferring a flat article having upward and downward surfaces;

an information surface detecting means disposed along said transfer path for detecting which one of said upward and downward surfaces of said flat article has information to be read;

two reading means disposed on opposites sides of said transfer path in opposition to each other and disposed downstream of said information surface detecting means, said reading means being positioned for reading said information on said flat article;

two pairs of two rollers, each pair of said rollers being respectively disposed at an inlet and an outlet of said reading means along said transfer path for holding said flat article to be read, said two rollers nipping said flat article at said inlet and said outlet to hold said flat article; and

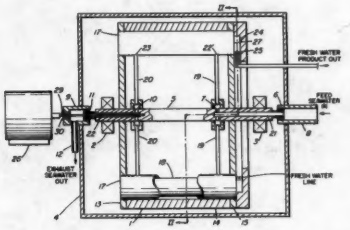
roller control means responsive to an output of said information surface detecting means for fixing the position of either roller in said pair of two rollers such that a distance between said surface of said flat article having said information thereon is kept constant with respect to the reading means confronting the surface of said flat article having said information thereon.

4,886,597

CENTRIFUGAL REVERSE-OSMOSIS DESALINATION UNIT

Peter M. Wild; Geoffrey W. Vickers; David A. Hopkin, and Antony Moilliet, all of Victoria, Canada, assignors to Her Majesty the Queen in right of Canada, Ontario, Canada

Filed Sep. 12, 1988, Ser. No. 243,273
Claims priority, application Canada, Sep. 24, 1987, 547791
Int. Cl.[4] B01C *13/00*
U.S. Cl. 210—321.68 13 Claims



1. An apparatus for separating an original feed solution into a product solution of decreased concentration and an exhaust solution of increased concentration, comprising:

reverse-osmosis membrane means;

a single rotor assembly housing said reverse osmosis means, said rotor assembly comprising an array of pressure vessels each containing a reverse-osmosis membrane and support means for said array including axle means about which the assembly is rotatable, wherein said pressure vessels are radially spaced from said axle means about the periphery of said assembly;

supply means for supplying the original feed solution to said reverse-osmosis membrane means;

exhaust means for removing the exhaust solution of increased concentration from reverse-osmosis membrane means;

product removal means for removing the product solution of decreased concentration from said reverse-osmosis membrane means;

means for creating a pressure differential within said reverse-osmosis membrane to separate the original feed solution into the product solution and the exhaust solution; and

evacuated enclosure means for said reverse-osmosis membrane means, said evacuated enclosure means being in the form of a shroud which closely fits over said rotor assembly to minimize windage losses.

4,886,598

LIQUID MEMBRANE COATED ION-EXCHANGE COLUMN SOLIDS

Dale P. Barkey, Berkeley, Calif., assignor to The United States of America as represented by the Department of Energy, Washington, D.C.

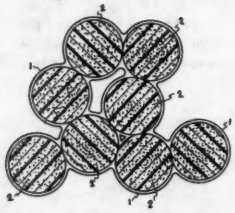
Division of Ser. No. 922,426, Oct. 23, 1986, Pat. No. 4,747,949.
This application Mar. 7, 1988, Ser. No. 164,659
Int. Cl.[4] B01D *13/00, 15/04*
U.S. Cl. 210—263 7 Claims

1. An ion exchange composition useful for separation of metal cations in an aqueous solution comprising:

a plurality of cation exchange resin beads capable of being confined in close proximity to each other; and,

a liquid membrane removably formed on said beads, the

liquid membrane being permeable to metal cations in an aqueous solution, the liquid membrane including a carrier



compound having a specificity for the cation sufficient to complex the cations in the membrane.

4,886,599

FILTER CARTRIDGE WITH SERIES ELEMENTS FOR CHEMICAL AND MECHANICAL FILTRATION

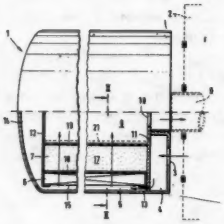
Paul Bachmann; Hanns-Peter Berges, both of Cologne, and Wolfgang Leier, Bergisch-Gladbach, all of Fed. Rep. of Germany, assignors to Leybold AG, Cologne, Fed. Rep. of Germany

Filed Oct. 23, 1987, Ser. No. 111,592

Claims priority, application Fed. Rep. of Germany, Oct. 23, 1986, 8628284[U]

Int. Cl.[4] B01D *27/02, 27/06*

U.S. Cl. 210—287 7 Claims



1. A filter cartridge for cleaning oil contained in an oil sealed vacuum pump comprising:

a cartridge housing, said cartridge housing being releasably mountable to the vacuum pump;

a fluid path defined in said cartridge housing; and

at least two types of filtering means having respectively different characteristics disposed in series in said cartridge housing along and forming a part of said fluid path,

said filtering means including a mechanically acting filter stage and a chemically acting filter stage, said mechanically acting filter stage being disposed upstream of said chemically acting filter stage with respect to said fluid path, said chemically acting filter stage being composed of at least one of a chemical absorbent and adsorbent from the class consisting of fuller's earth and activated aluminum oxide in the form of a granulate having a grain size from 1 to 3 mm.

4,886,600

MOISTURE AND GLYCERINE RESISTANT POLYURETHANE COMPOSITIONS FOR SEPARATORY DEVICES

Yuan C. Chu, East Windsor, and Melvin Brauer, E. Brunswick, both of N.J., assignors to CasChem, Inc., Bayonne, N.J.

Filed Feb. 18, 1988, Ser. No. 161,568

Int. Cl.[4] B01D *13/01*

U.S. Cl. 210—321.8 30 Claims

1. A hollow fiber separatory device capable of use in biomedical applications comprising a hollow fiber bundle consisting of a plurality of fine hollow fibers whose end portions are potted in a tube-sheet and whose open fiber ends terminate in a tube-sheet face, the resulting bundle being sealed within a casing to a form a separatory cell having two or more fluid ports which allow for the passage of one fluid through the fibers and another around the fibers without mixing of the two fluids, said tube-sheet comprising a cured polyurethane composition comprising the reaction product of a polyol of a liquid ester of a carboxylic acid having at least 8 carbon atoms, said polyol having an equivalent weight of between 60 and 275; and an organic polyisocyanate compound; the reactants of said reaction comprising preselected properties for accelerating said reaction sufficient to substantially preclude bubble formation.

4,886,601

COLUMN FILTER USING BUNDLES OF LONG FIBERS

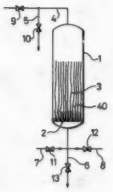
Takeshi Iwatsuka, Tokyo, and Toshio Kasai, Saitama, both of Japan, assignors to Japan Organo Co., Ltd., Tokyo, Japan

Filed May 25, 1989, Ser. No. 357,321

Claims priority, application Japan, May 31, 1988, 63-131715; Nov. 30, 1988, 300980

Int. Cl.[4] B01D *13/01*

U.S. Cl. 210—321.79 3 Claims



1. A column filter using bundles of long fibers, said filter being provided with an upright cylindrical shell and the bundles of long fibers being arranged substantially upright inside the shell with lower end portions thereof being fixed and upper end portions thereof being free-standing, whereby, when a raw liquid with suspended solids therein is fed to a top part of the shell and is then allowed to pass from the upper end portions of the bundles of long fibers toward their lower end portions, the suspended solids are at least partly trapped in interstices among the, fibers, the improvement comprising: structure having properties for providing an operable filtration time longer than a column filter in which the bundles of long fibers have a length of less than 1000 mm, including, a supporting member is arranged transversely in a lower interior part of the shell, the bundles of long fibers have a length in a range longer than 1,000 mm but shorter than 3,000 mm and are fixed at the lower end portions thereof on an upper surface of said supporting member, and the packing density of the bundles is in a range such that the bundles may retain 30–80% of the original height thereof while the raw liquid with suspended solids is being fed into the shell and compressing the bundles toward the supporting member.

4,886,602

PROCESS FOR THE SEPARATION OF BIOTECHNOLOGICALLY PRODUCED VALUABLE MATERIALS FROM A FERMENTER BROTH BY CROSSFLOW MICRO- AND/OR ULTRAFILTRATION

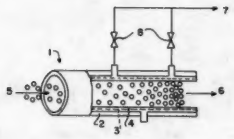
Norbert Kuehne, Haan; Wilfried Raehse, Duesseldorf, and Franz-Josef Carduck, Haan, all of Fed. Rep. of Germany, assignors to Henkel Kommanditgesellschaft auf Aktien, Duesseldorf, Fed. Rep. of Germany

Filed Sep. 15, 1988, Ser. No. 245,101

Claims priority, application Fed. Rep. of Germany, Sep. 15, 1987, 3730868

Int. Cl.[4] B01D *13/00*

U.S. Cl. 210—637 9 Claims



1. A process for the separation of valuable biologically produced compositions from a fermenter broth which comprises: providing universally applicable maximal recovery of said compositions under high flux by passing the fermenter broth through at least two modules which can be microfiltration or ultrafiltration separation modules arranged in series wherein the fermenter broth, at a first pressure, contacts a separation membrane in the first module to produce a concentrate and a permeate in the first module, the permeate is produced at a pressure lower than the first pressure, and the fermenter broth is passed through each succeeding module in the series at a pressure lower than the pressure in the preceeding module to produce a permeate at a pressure lower than the pressure in the module and controlling the pressure of the permeate in each module so that the permeate absolute pressure in each module is different.

4,886,603

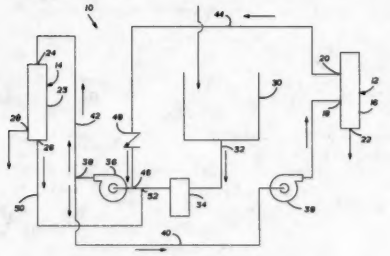
METHOD AND APPARATUS FOR WATER DECONTAMINATION

John A. Taylor, Pinckney, Mich., assignor to Separation Dynamics, Inc., Southfield, Mich.

Filed Feb. 6, 1989, Ser. No. 306,564

Int. Cl.[4] B01D *13/00*

U.S. Cl. 210—641 12 Claims



1. A method of continuously separating water and water soluble substances and hydrocarbons and/or halogenated hydrocarbons from contaminated water, said method including the steps of: conducting a flow of contaminated water; separating a water and water soluble substances permeate at a first separation module and a hydrocarbon and/or halogenated hydrocarbon permeate at a second separation module from a retentate flow of concentrating contaminated water; and recycling the retentate flow between the separation modules.

4,886,604

STRUCTURE WITH MEMBRANES HAVING CONTINUOUS PORES

Uwe Sleytr, 10, Parhamerplatz, A-1170 Vienna, and Margit Sara, 90/2/24 Vorgartenstr., A-1200 Vienna, both of Australia

PCT No. PCT/AT85/00060, § 371 Date Aug. 19, 1986, § 102(e) Date Aug. 19, 1986, PCT Pub. No. WO86/03685, PCT Pub. Date Jul. 3, 1986

PCT Filed Dec. 23, 1985, Ser. No. 916,517

Claims priority, application Australia, Dec. 21, 1984, 406984; South Africa, Mar. 6, 1985, 851706; Australia, Nov. 8, 1985, 324785

The portion of the term of this patent subsequent to Jun. 21, 2005, has been disclaimed.

Int. Cl.[4] B01D *13/00*

U.S. Cl. 210—653 39 Claims

1. A method for producing a structure comprising at least one membrane with continuous pores having a diameter range of 1 to 8 nm extending along plane, curved, cylindrical or vesicular surfaces consisting essentially of at least one layer of contiguous identical protein containing molecules which molecules are arranged to form a crystal lattice defining continuous pores free of said molecules, the membranes being connected to or embedded in a support layer or the membranes being connected together to form a stable unsupported film comprising removing the cell contents from intact cells of microorganisms or breaking the intact cells and separating the membranes or membrane containing cell envelope fragments, suspending the membranes or membrane containing cell envelope fragments in a liquid medium, combining the membranes or membrane containing cell envelope fragments into a layer with a crystal lattice with continuous pores free of the protein containing molecules by depositing the membranes or membrane containing cell envelope fragments onto a support layer or introducing said fragments into a support layer or connecting said fragments together to form a stable unsupported film.

15. Application of a structure produced according to claim 1, characterized in that it is used as carrier for other semipermeable membrances which extend over at least one member of the group consisting of pores and cell-wall fragments of the structure, whereat, appropriately, these other semi-permeable membranes are cross-linked, directly or through bifunctional foreign molecules, with protein molecules or protein-containing molecules of the cell-wall fragments of the structure through at least one group selected from the group consisting of carboxyl groups and amino groups and hydroxyl groups.

4,886,605

ALL-PURPOSE SEPTIC TANK

Philip Hervé, Montpellier, France, assignor to Eparco, Paris, France

Continuation of Ser. No. 29,077, Mar. 23, 1987, abandoned. This application Dec. 5, 1988, Ser. No. 282,948

Claims priority, application France, Mar. 25, 1986, 8604265

Int. Cl.[4] B01D *21/02*

U.S. Cl. 210—170 29 Claims

1. An all purpose septic tank system comprising:

a liquid-fillable, single compartment, rigid chamber;

an inlet conduit having a downstream section open upwards to allow a portion of the incoming waste to flow upwardly, wherein said inlet conduit communicates with said rigid chamber, and wherein said inlet conduit forms a double bend folded back onto itself;

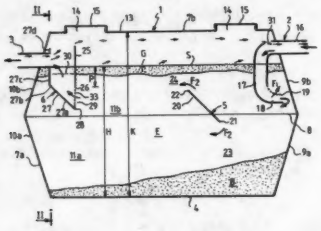
an outlet conduit communicating with said rigid chamber;

clarification means within said rigid chamber for forcing the heaviest portions of the incoming waste to the bottom of

said rigid chamber comprising a first angled deflector having upper and lower end portions, wherein said first deflector extends over a substantial part of the width of said rigid chamber for stopping turbulence from reaching the bottom of said rigid chamber and wherein said lower end portion of said first angled deflector is spaced from the bottom of said rigid chamber;

protection means within said rigid chamber for preventing the clogging of land treatment systems comprising:

a second deflector having a lower end, wherein said second



deflector is, located near an end wall of said rigid chamber;

a vertical partition spaced directly above the lower end of said second deflector said vertical partition being constructed and arranged to have a portion below the surface of the liquid in said rigid chamber;

first and second side partitions connecting said second deflector to said vertical partition; and

a passage communicating with said outlet conduit defined by said second deflector, said fist and second side partitions and said vertical position.

4,886,606

METHOD OF PURIFYING CONDENSATE WATERS FOR STEAM REGENERATING EQUIPMENT

David H. Clemens, Willow Grove; Marvin J. Hurwitz, Elkins Park, and Robert W. Walker, Fort Washington, all of Pa., assignors to Rohm and Haas Company, Philadelphia, Pa.

Continuation-in-part of Ser. No. 641,464, Dec. 17, 1975, abandoned, which is a continuation-in-part of Ser. No. 428,968, Dec. 27, 1973, abandoned. This application Jun. 13, 1988, Ser. No. 206,073

Int. Cl.[4] C02F *1/42, 1/64*

U.S. Cl. 210—684 **1 Claim**

1. A process for removing corrosion products from high pressure boiler condensate waters at elevated temperatures which comprises contacting the waters containing the corrosion products at a temperature of at least 100° C. with a mass of crosslinked vinyl benzyl chloride strong base ion exchange resin wherein the crosslinker is a polyvinyl compound.

4,886,607

APPARATUS FOR FILTERING, RETAINING AND DISPOSAL OF WASTE WATER ACCUMULATED ON A BOAT

Eugene L. Lalonde, Salmon Arm; Michael R. Bruynesteyn, and Thomas M. Unger, both of Vancouver, all of Canada, assignors to Aqua Trend Systems Inc., Salmon Arm, Canada

Filed Mar. 15, 1989, Ser. No. 323,891

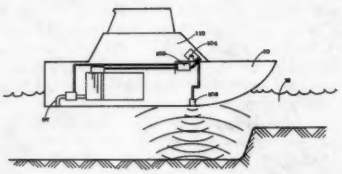
Int. Cl.[4] C02F *3/00*; E03D *1/00, 9/00*

U.S. Cl. 210—739 **32 Claims**

1. An apparatus comprising: means for disposal of Grey water from a tank in a boat including,

(a) a depth measuring device responsive to water depth below the boat, the depth measuring device providing a depth signal representing said water depth in relation to a pre-determined water depth;

(b) signal generating means for generating a discharge signal in response to the depth signal;



(c) discharge means for discharging Grey water from the tank, the discharge means being responsive to the discharge signal.

4,886,608

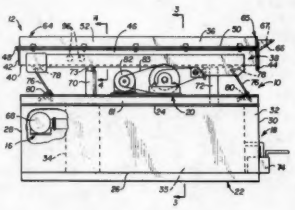
APPARATUS AND METHOD FOR SEPARATING LIQUIDS AND SOLIDS

Gary E. Cook, 2209 East Y St., Vicksburg, Mich. 49097

Filed Oct. 24, 1988, Ser. No. 261,777

Int. Cl.[4] B01D *33/36*

U.S. Cl. 210—785 **10 Claims**



9. A method for separating liquids and solids from a mixture thereof comprising the steps of:

depositing a mixture of liquids and solids on an upper surface of a generally horizontally extending filter means positioned in a trough structure;

applying oscillating movement to the trough structure to move the mixture in a conveying direction;

applying a vacuum beneath said filter means to draw the liquid downwardly from the solids; and

intermittently flexing a perforated sheet beneath and in generally continuous contact with the filter means by means comprising means for pulsating the vacuum to maintain the filter means unobstructed by solids.

4,886,609

METHOD FOR STIMULATION OF OIL AND GAS WELLS

William B. Walton, Cleburne, Tex., assignor to GAF Corporation, Wayne, N.J.

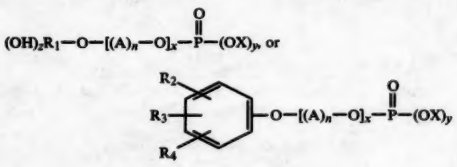
Filed Oct. 9, 1987, Ser. No. 106,826

Int. Cl.[4] E21B *37/06, 43/27*

U.S. Cl. 252—8.552 **9 Claims**

1. A method for the removal of scale from the interior of producing oil and gas wells comprising the steps of:

(a) preparing a first mixture of an alkyl or aralkyl polyoxylene phosphate ester and a mutual solvent obtained by blending of a water soluble alcohol selected from the group consisting of methanol, ethanol, propanol and isopropanol, and an aromatic hydrocarbon, the phosphate ester having the formula



wherein:

R_1 represents an alkyl radical having 10 to 18 carbon atoms;

R_2 represents an alkyl of about 5 to 27 carbon atoms, cycloalkyl, and radicals derived from mineral oils containing alkyl, cycloalkyl and mixed alkylcycloalkyl radicals having from about 12 to 27 carbon atoms;

R_3 and R_4 represent hydrogen, alkyl having from about 1 to 22 carbon atoms, cycloalkyl, and radicals derived from mineral oils containing alkyl, cycloalkyl and mixed alkylcycloalkyl radicals having from about 12 to 27 carbon atoms;

A represents the residue of ethylene oxide, ethylene oxide and tetrahydrofuran, or mixed lower alkylene oxides selected from the group consisting of ethylene oxide, propylene oxide, and butylene oxide alone or including tetrahydrofuran; and wherein the total molecular weight of the ester is about 500 to about 1,500, and A is heteric or block in molecular configuration; and wherein

the degree of oxyalkylation is represented by n; x and y are 1 or 2; the sum of x and y is 3; z is an integer from 0 to 5; and

X is hydrogen or a monovalent cation selected from the group consisting of an alkali metals; alkyl amines and ammonium;

(b) preparing a second mixture by admixing a mineral acid to said first mixture to form a micellar emulsion thereof wherein the acid is present in a scale deposit effective dissolving amount and the phosphorate ester is present in an amount sufficient to maintain the acid and mutual solvent in said micellar emulsion state;

(c) introducing the second mixture to a well;

(d) retaining the mixture in the well for a period of time sufficient to allow the acid to solubilize the mineral deposits therein; and

(e) removing the mixture and solubilized mineral deposits from the well interior.

4,886,610
LUBRICANT COMPOSITIONS, NOVEL GLUCAMINE DERIVATIVES AND COMPLEX COMPOUNDS CONTAINING SAME

Hermann O. Wirth, Bensheim, and Hans-Helmut Friedrich, Lautertal, both of Fed. Rep. of Germany, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

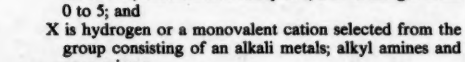
Division of Ser. No. 137,268, Dec. 23, 1987, Pat. No. 4,808,755, which is a division of Ser. No. 876,953, Jun. 20, 1986, Pat. No. 4,732,691. This application Dec. 15, 1988, Ser. No. 284,582

Claims priority, application Switzerland, Jun. 21, 1985, 2648/85; Jul. 2, 1985, 2818/85

Int. Cl.[4] C10M *129/04, 133/02*

U.S. Cl. 252—32.5 **14 Claims**

1. A complex compound of a metal salt, semi-metal salt, metal or semi-metal hydroxide, metal or semi-metal oxide or of a protic acid of the general formula II



(II)

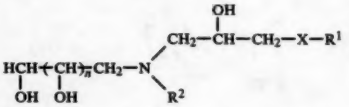
wherein

M is a cation of valency m of a metal or semi-metal cation or is an oxymetal or dioxymetal cation or a proton,

X is an anion of valency n of an n-basic inorganic protic acid or of an n-basic organic acid selected from the group consisting of aliphatic and cycloaliphatic carboxylic acids containing up to 8 carbon atoms and which may be substituted by halogen atoms and/or hydroxyl groups, of aromatic mono-, di- and tricarboxylic acids which may be substituted by hydroxyl groups, halogen atoms and/or nitro groups, of organic oxyacids of phosphorus and sulfur, of organic thioacids of phosphorus, and from the group of the mercaptans, said inorganic or organic acids having a pK_a value of no more than 15.8 and, if m is a proton, of not more than 11, or X^n is —OH or O,

Y is water or a neutral organic molecule which forms a co-ordinate bond with the cation or with the anion,

Z is a compound of formula I



(I)

wherein n is 2, 3 or 4, X is —S—, —O—, —O—CO— or —CH_2—, R^1 is C_1–C_{22}alkyl, C_5–C_6cycloalkyl or phenyl, and R^2 is hydrogen, C_1–C_8alkyl, C_2–C_4alkyl which is substituted by an —OH group, or a group of the formula —CH_2—CH(OH)—CH_2—X—R^1, wherein X and R^1 have the given meanings,

p is a value from 0 to 2,

q is a value from 1 to 8,

m is an integer from 1 to 6, and

n is an integer from 1 to 4.

4,886,611
HYDROCARBON COMPOSITIONS CONTAINING POLYOLEFIN GRAFT POLYMERS

Maria M. Kapuscinski, Carmel; Larry D. Grina, Wappingers Falls; Ronald E. Jones, Glenham, and Rodney L. Sung, Fishkill, all of N.Y., assignors to Texaco Inc., White Plains, N.Y.

Division of Ser. No. 726,567, Apr. 24, 1985, Pat. No. 4,820,776. This application Jul. 22, 1988, Ser. No. 222,869

Int. Cl.[4] C10M *145/18, 149/00*

U.S. Cl. 252—47 **11 Claims**

1. A lubricating oil composition containing a major portion of a lubricating oil and a minor effective portion of a graft polymer comprising an oil-soluble substantially linear, carbon-carbon backbone polymer having bonded thereto (i) first graft units derived from a first monomer amine containing a polymerizable, ethylenically unsaturated double bond and (ii) second units derived from a phenothiazine second monomer.

4,886,612
LUBRICATING OIL

Yuzo Higaki; Hiroyuki Goto, and Keiichi Tanikawa, all of Kanagawa, Japan, assignors to The Nisshin Oil Mills, Ltd. and Nippon Steel Corporation, both of Tokyo, Japan

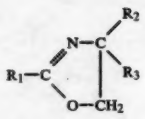
Filed Jul. 27, 1988, Ser. No. 225,047

Claims priority, application Japan, Jul. 31, 1987, 62-190143; Jul. 31, 1987, 62-190144

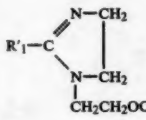
Int. Cl.[4] C10M *133/38, 133/46*

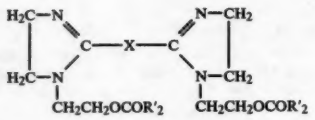
U.S. Cl. 252—49.5 **2 Claims**

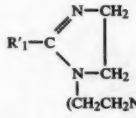
1. A lubricating oil comprising from 99 weight percent to 1 weight percent of a base oil and from 1 weight percent to 99 weight percent of at least one member selected from the group consisting of compounds expressed by the following formulas I, II, III, IV or V:

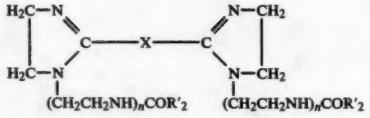


wherein R_1 represents an alkyl group, an alkenyl group, a hydroxyalkyl group, a hydroxyalkenyl group, each of 5 or more carbon atoms or a phenyl group; R_2 and R_3 each represent CH_2OCOR_1, CH_2OH or H wherein R_1 is as defined above:

II 

III 

IV 

V 

wherein R'_1 and R'_2 each represent an alkyl group, an alkenyl group, a hydroxyalkyl group, a hydroxyalkenyl group each of 5 or more carbon atoms or a phenyl group; n represents an integer of 1 to 3; and X represents an alkyl group, an alkenyl group, each of 2 to 34 carbon atoms or a phenyl group.

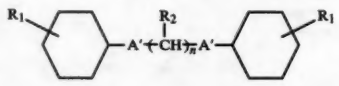
4,886,613

TRACTION FLUID

Narihiko Yoshimura; Yasuji Komatsu, and Hirotaka Tomizawa, all of Saitama, Japan, assignors to TOA Nenryo Kogyo, K.K., Tokyo, Japan

Filed Jul. 23, 1987, Ser. No. 76,708
Int. Cl.[4] C09K 5/00
U.S. Cl. 252—79 **10 Claims**

1. A traction fluid comprising a major amount of diester or its derivative represented by the general formula



wherein A′ is an ester linkage of —COO— or —OOC—, n is an integer of from 1 to 10, R_1 is independently selected from the group consisting of hydrogen and alkyl groups having 1 to 8 carbon atoms, and R_2 is independently selected from the group consisting of hydrogen and alkyl groups having 1 to 3 carbon atoms; and a minor amount of at least one material selected from the group consisting of antioxidants, wear inhibitors, corrosion inhibitors and viscosity index improvers.

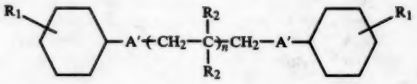
4,886,614

SYNTHETIC TRACTION FLUID

Narihiko Yoshimura; Hirotaka Tomizawa, and Yasuji Komatsu, all of Saitama, Japan, assignors to Toa Nenryo Kogyo, K.K., Tokyo, Japan

Filed Jun. 23, 1987, Ser. No. 65,827
Int. Cl.[4] C09K 5/00
U.S. Cl. 252—79 **11 Claims**

1. A traction fluid comprising a major amount of diester or its derivative represented by the formula



wherein

A′ is an ester linkage of —COO— or —OOC—,

n is an integer of 1 to 6,

R_1 is independently selected from the group consisting of hydrogen and alkyls containing from 1 to 8 carbon atoms, and

R_2 is independently alkyls containing from 1 to 3 carbon atoms; and

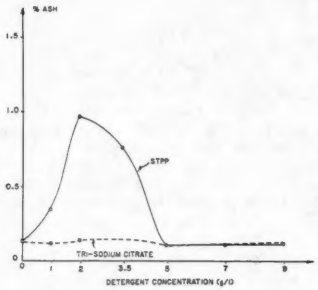
minor amount of at least one material selected from the group consisting of antioxidants, wear inhibitors, corrosion inhibitors and viscosity index improvers.

4,886,615

HYDROXY POLYCARBOXYLIC ACID BUILT NON-AQUEOUS LIQUID CLEANING COMPOSITION AND METHOD FOR USE, AND PACKAGE THEREFOR

Louis Dehan, Seraing, Belgium, assignor to Colgate-Palmolive Company, New York, N.Y.

Continuation-in-part of Ser. No. 63,199, Jun. 17, 1987, and a continuation-in-part of Ser. No. 830,921, Feb. 19, 1986, Pat. No. 4,767,558, which is a continuation-in-part of Ser. No. 762,165, Aug. 15, 1985, abandoned. This application Mar. 21, 1988, Ser. No. 171,341
Int. Cl.[4] C11D 17/00, 1/722, 3/395, 3/43
U.S. Cl. 252—90 **18 Claims**



1. A unitary laundry detergent product for use in an automatic laundry washing machine comprising a sachet comprising an outer package of a water-permeable water-insoluble plastic film or textile fabric, an inner package within said outer package, said inner package formed from a water-soluble polymer film, and sealed within said inner package an amount of from about 50 to about 150 grams of a non-aqueous liquid

fabric treating composition which comprises, based on the total composition, on a weight basis,

from about 20% to about 70% of liquid nonionic surfactant detergent,

from about 20% to about 60% of alkali metal hydroxy polycarboxylic acid salt having from 4 to 8 carbon atoms, and

from about 0.5 to 20% of a lower alkylene glycol alkyl ether solvent, in amount sufficient to lower the viscosity and gelling temperature of the composition such that the composition remains pourable at temperatures at least as low as 5° C.

4,886,616

ALUMINUM SURFACE CLEANING AGENT

Katsuyoshi Yamasoe, Chiba; Kiyotado Yasuhara, and Satoshi Ikeda, both of Kanagawa, all of Japan, assignors to Amchem Products, Inc., Ambler, Pa.

Division of Ser. No. 793,019, Oct. 30, 1985, Pat. No. 4,728,456. This application Jul. 31, 1987, Ser. No. 80,527

Claims priority, application Japan, Oct. 30, 1984, 59-22996

The portion of the term of this patent subsequent to Mar. 1, 2005, has been disclaimed.

Int. Cl.[4] C11D *7/08*

U.S. Cl. 252—142 **8 Claims**

1. An aqueous chromium free, fluoride free cleaning composition for aluminum and aluminum alloy surfaces consisting of:

A. from about 0.2 to about 4 g/l of ferric ions; and

B. a sufficient quantity of sulfuric and/or nitric acid to produce a pH of 2 or less for the composition.

4,886,617

WATER SOLUBLE PHOSPHONATED POLYMERS

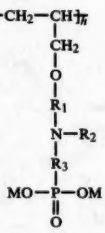
Fu Chen, Newtown, and Keith Bair, Hatboro, both of Pa., assignors to Betz Laboratories, Inc., Trevose, Pa.

Continuation of Ser. No. 313,692, Feb. 21, 1989, Pat. No. 4,851,490, which is a continuation-in-part of Ser. No. 191,309, May 6, 1988, Pat. No. 4,849,129, which is a continuation-in-part of Ser. No. 37,484, Apr. 13, 1987, Pat. No. 4,759,851, which is a continuation of Ser. No. 864,049, May 16, 1986, Pat. No. 4,659,481, which is a continuation of Ser. No. 545,563, Oct. 26, 1988, abandoned. This application May 19, 1989, Ser. No. 354,547

Int. Cl.[4] C02F *5/10*; C23F *11/16*

U.S. Cl. 252—180 **14 Claims**

1. A method of inhibiting the formation and deposition of scale imparting compounds in an aqueous system, comprising adding a sufficient amount for the purpose of a water soluble polymer having repeat units of the structure:



wherein E in the above formula is the repeat unit obtained after polymerization of ethylenically unsaturated compounds, R_1 is a hydroxyl substituted lower alkylene group having from about 1–6 carbon atoms or a nonsubstituted lower alkylene group having from about 1–6 carbon atoms; R_2 is hydrogen or a lower alkyl group having from about 1–5 carbon atoms; R_3 is a lower alkylene group having from about 1–6 carbon atoms; M is hydrogen or a water soluble cation; the molar ratio of said repeat units g:h being within the range of 30:1 to 1:20.

4,886,618

ALDEHYDE OR IMINE OXYGEN SCAVENGERS FOR VINYL POLYMERIZATIONS

Ronald W. Novak, Chalfont, and William D. Emmons, Huntington Valley, both of Pa., assignors to Rohm and Haas Company, Philadelphia, Pa.

Continuation of Ser. No. 835,138, Apr. 10, 1986, abandoned, which is a division of Ser. No. 632,553, Jul. 19, 1984. This application Apr. 4, 1988, Ser. No. 180,715

Int. Cl.[4] C09K *15/06, 15/18*

U.S. Cl. 252—188.28 **3 Claims**

1. Composition comprising (A) an aldehyde or imine of the formula

$$R_3Q_n$$

wherein n is 1–4; R_3 is an organic radical having a valence of 1–4; Q is of the formula

wherein A is O or NR_4; R_1, R_2, and R_4 are independently selected from C_{1-6} alkyl or aryl radicals or mixtures thereof; and (B) a transition metal ion selected from the group consisting of Co^{++}, Cu^{++}, and Mn^{++}, wherein said composition has the characteristics of an oxygen scavenger in the polymerization of one or more vinyl unsaturated monomers, oligomers and/or polymers in the presence of oxygen.

4,886,619

FLUORINE-CONTAINING CHIRAL SMECTIC LIQUID CRYSTALS

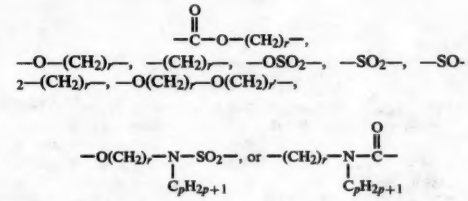
Eugene P. Janulis, Mahtomedi, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Continuation-in-part of Ser. No. 879,988, Jun. 30, 1986, abandoned. This application May 29, 1987, Ser. No. 53,551

Int. Cl.[4] G02F *1/13*; C09K *19/34, 19/30, 19/12, 19/20*

U.S. Cl. 252—299.1 **10 Claims**

1. Compounds comprising a fluorocarbon terminal portion represented by the formula $-DC_qF_{2q}X$ where X is hydrogen or fluorine, q is 1 to 20, and D is



where r and r' are independently 1 to 20, and p is 0 to 4, and a chiral hydrocarbon terminal portion, said terminal portions being connected by a central core, said compounds having tilted smectic mesophases or having latent tilted smectic mesophases which develop when said compounds having said latent mesophases are in admixture and said compounds having tilted smectic mesophases or said compounds having latent tilted smectic mesophases.

4,886,620

SMECTIC LIQUID-CRYSTALLINE PHASES

Reinhard Hopf, Heringen, Fed. Rep. of Germany; Bernhard Scheuble, Yokohama, Japan; Andreas Wächtler, Griesheim, Fed. Rep. of Germany; Reinhard Hittich, Modautal, Fed. Rep. of Germany; Rudolf Eidenschink, Münster, Fed. Rep. of Germany; Thomas Geelhaar, Mainz, Fed. Rep. of Germany; Joachim Krause, Dieburg, and Volker Reiffenrath, Darmstadt, all of Fed. Rep. of Germany, assignors to Merck Patent Gesellschaft mit Beschrankter Haftung, Darmstadt, Fed. Rep. of Germany

PCT No. PCT/EP86/00529, § 371 Date May 13, 1987, § 102(e) Date May 13, 1987, PCT Pub. No. WO87/01717, PCT Pub. Date Mar. 26, 1987

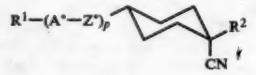
PCT Filed Sep. 15, 1986, Ser. No. 51,120

Claims priority, application Fed. Rep. of Germany, Sep. 18, 1985, 3533333; Mar. 14, 1986, 3608500

Int. Cl.[4] G02F *1/13;* C09K *19/34, 19/30*

U.S. Cl. 252—299.61 9 Claims

1. In a liquid crystal phase having ferroelectric properties useful for rapidly switching displays and comprising at least two liquid crystalline compounds which form an achiral base mixture having a tilted smectic phase, and a chiral doping substance, the improvement wherein at least one compound of the achiral base mixture is of the formula



wherein

R^1 and R^2 are each independently of each other an alkyl group or a polyfluoroalkyl group containing 1 to 15 C atoms in each case, wherein one or more CH_2 groups or CF_2 groups may also be replaced by a group selected from the group consisting of —O—, —S—, —CO—, —CH-halogen—, —CHCN—, —O—CO—, —O—COO—, —CO—O— and —CH=CH— or else by a combination of two suitable said groups, two hetero atoms not being directly linked to each other;

A^* is unsubstituted 1,4-phenylene or 1,4-phenylene substituted singly or multiply by halogen atoms wherein one or more CH groups may also be replaced by N (Ph);

Z^* denotes —CO—O—, —O—CO—, —CH_2O—, —OCH_2—, —CH_2CH_2— or a single bond; and

P denotes 2 or 3.

4,886,621

LIQUID CRYSTAL PHASE

Ian C. Sage, Broadstone; Michael K. Chambers, Parkstone, both of Great Britain; Reinhard Hittich, Modautal, and Georg Weber, Erzhausen, both of Fed. Rep. of Germany, assignors to Merck Patent Gesellschaft mit beschrankter Haftung, Darmstadt, Fed. Rep. of Germany

PCT No. PCT/EP87/00490, § 371 Date May 6, 1988, § 102(e) Date May 6, 1988, PCT Pub. No. WO88/02018, PCT Pub. Date Mar. 24, 1988

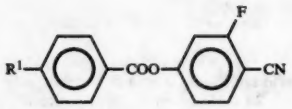
PCT Filed Aug. 28, 1987, Ser. No. 192,742

Claims priority, application United Kingdom, Sep. 8, 1986, 8621603; Jun. 5, 1987, 87132208

Int. Cl.[4] G02F *1/13;* C09K *19/54, 19/34, 19/30, 19/20, 19/12*

U.S. Cl. 252—299.61 19 Claims

1. A liquid crystal phase consisting essentially of 4 to 36 wt.% of at least one component of the formula I



I

wherein R^1 is alkyl of 1 to 12 C atoms;

at least one component of the formula II

$$R^1—A^2—Phe—CN \qquad II$$

wherein

A^2 is Cy, Phe, Phe—COO, Cy—COO, Phe—Phe, Phe—COO—Phe, Phe—PHe—COO—Phe, Cy—Phe or Cy—COO—Phe,

Cy is trans-1,4-cyclohexylene,

Phe is 1,4-phenylene, and

R^1 has the meaning indicated above,

whereby the total proportion of compounds of the formulae I and II is more than 5 wt.%,

22 to 71 wt.% of one or more components of the formula III

$$R^1—A^3—COO—Phe—R^2 \qquad III$$

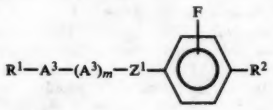
wherein A^3 is Cy or Phe,

R^1 and R^2 each are independently alkyl of 1 to 12 C atoms, and Cy and Phe have the meanings indicated above;

0 to 25 wt.% of one or more components of the formula IV and/or VI

$$R^1—A^3—(Z^1—A^3)_2—R^2 \qquad IV$$

VI



wherein Z^1 independently is —CO—O— or —O—CO—, m is 0 or 1 and R^1, R^2 and A^3 independently have the meanings indicated above;

and 0 to 28 wt.% of compounds of the formula Va

$$R^1—Dio—Phe—CN \qquad Va$$

wherein R^1 is alkyl of 1 to 7 C atoms, Dio is trans-1,3-dioxane-2,5-diyl and Phe is 1,4-phenylene.

4,886,622

OPTICALLY ACTIVE LIQUID CRYSTAL COMPOUND HAVING CYANO GROUP

Kazutoshi Miyazawa; Takashi Inukai; Hiromichi Inoue; Shinichi Saito, and Kouji Ohno, all of Kanagawa, Japan, assignors to Chisso Corporation, Ohsaka, Japan

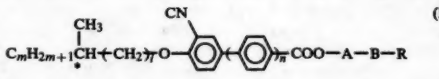
Filed Aug. 18, 1987, Ser. No. 270,865

Claims priority, application Japan, Aug. 18, 1986, 61-192516

Int. Cl.[4] G02F *1/13;* C09K *19/30, 19/34, 19/46, 19/20, 19/12;* C07C *121/75, 239/30*

U.S. Cl. 252—299.61 13 Claims

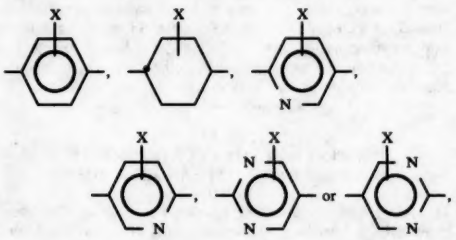
1. An optically active liquid crystalline compound expressed by the formula



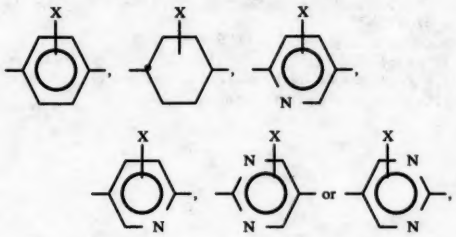
(I)

wherein m represents an integer of 2 to 18; l represents an integer of 0 to 12; n represents 0 to 1; R represents an alkyl

group or an alkoxy group each of 2 to 20 carbon atoms, a halogen atom or a cyano group; A represents a single bond,



and B represents



wherein X represents a hydrogen atom, a halogen atom or a cyano group.

4,886,623

FERROELECTRIC SMECTIC LIQUID CRYSTAL COMPOUND AND COMPOSITION CONTAINING THE SAME

Shigeru Mitsuhashi; Hitoshi Kondo; Tetsuharu Okazaki; Shinji Endoh; Hiroko Kudo; Akio Yamaguchi; Haruki Tsuruta, and Susumu Akutagawa, all of Tokyo, Japan, assignors to Takasago International Corporation, Tokyo, Japan

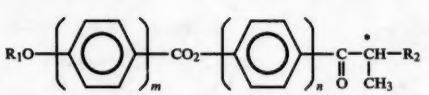
Filed Dec. 23, 1987, Ser. No. 137,281

Claims priority, application Japan, Dec. 23, 1986, 61-305341

Int. Cl.[4] C09K *19/12, 19/20;* **C07C** *69/76*

U.S. Cl. 252—299.65 **7 Claims**

1. A liquid crystal compound represented by formula (I):



(I)

wherein R_1 represents a straight chain alkyl group having from 4 to 18 carbon atoms; R_2 represents a straight chain alkyl group having from 2 to 6 carbon atoms or branched alkyl group having from 3 to 6 carbon atoms and having a methyl group as a side chain; m and n each represents 1 or 2, provided that m plus n is 3; and wherein said liquid crystal compound exhibits a spontaneous polarization value of 200 nC/cm^2 or higher in its chiral smectic phase.

4,886,624

COLLOIDAL ALCOHOL-DISPERSIBLE ASSOCIATION COMPLEXES OF CERIC DIOXIDE AND A HYDROXYPHENYL CARBOXYLIC ACID

Peter S. Gradeff, Pottersville, and Carlos Ramirez, Piscataway, both of N.J., assignors to Rhone-Poulenc, Inc., New Brunswick, N.J.

Filed Aug. 18, 1987, Ser. No. 87,076

Int. Cl.[4] B01J *13/00;* **C09K** *11/07;* **C09D** *3/26;* **C01F** *17/00*

U.S. Cl. 252—308 **10 Claims**

1. An association complex comprising ceric dioxide and a hydroxyphenyl carboylic acid having from about seven to about twenty carbon atoms in a molar ratio CeO_2/acid of at least about 6:1.

4,886,625

FUNCTIONALIZED CONDUCTING POLYMERS AND THEIR USE IN DIAGNOSTIC DEVICES

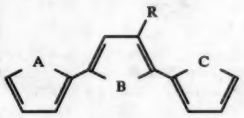
James P. Albarella, Elkhart; J. Oakey Noell; Paul O. Vogelhut, both of Mishawaka, and deceased, Frederick E. Ward, late of Elkhart, all of Ind. (by Linda Ward, administrix), assignors to Miles Inc., Elkhart, Ind.

Filed Oct. 29, 1987, Ser. No. 114,011

Int. Cl.[4] H01B *1/00, 1/06*

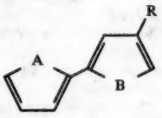
U.S. Cl. 252—500 **9 Claims**

1. An electrically-conducting polymer exhibiting sufficient conductivity and stability for use in an analyte sensor having monomeric units (I)



(I)

or monomeric units (II)



(II)

or both monomeric units (I) and (II)

wherein A is selected from the group consisting of sulfur, oxygen, selenium and tellerium; B is selected from the group consisting of sulfur, oxygen, selenium, tellurium and N—R^1, wherein N is nitrogen and R^1 is hydrogen, an alkyl group of 1 to 10 carbon groups or a hydroxy alkyl group having 1 to 10 carbon atoms; C is selected from the group consisting of sulfur, oxygen, selenium and tellurium; and R is selected from the group consisting of cyano, aminomethyl, N-trifluoroacetamidomethyl, 2-hydroxyethyl, 2-phthalimidoethyl, 2-aminoethyl, 2-trifluoroacetamidoethyl, acetyl, carboxyethyl, carboethoxyethyl, carbomethoxyethyl, (N-3-carbomethoxypropionyl-)aminoethyl, (N-3-carboxypropionyl)aminomethyl, 2-methyldithioethyl, (N-imidazocarbonyl)amidomethyl, (4-nitrophenylcarbamoyl)amidomethyl, formylmethyl and carboxymethyl; or R is an analyte probe molecule; and

from about 10 to about 35 atomic percent of a compensating counterion D selected from the group consisting of tetrafluoroborate, perchlorate, tetrachloroferrate III, tetrachlororuthenate, p-toluenesulfonate, picryl sulfonate, hexafluoroarsenate, trifluoromethylsulfonate, hexafluorophosphate, fluorosulfonate, trifluoroacetate, p-bromobenzenesulfonate, perruthenate, and mixtures thereof.

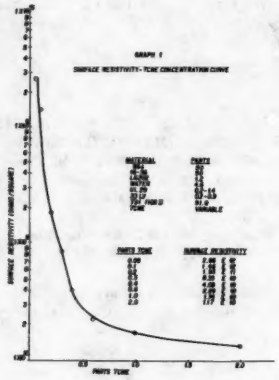
4,886,626
CONDUCTIVE POLYURETHANE FOAM COMPOSITIONS CONTAINING TETRALYANOETHYLENE AND METHOD

Richard P. Cope, New City, N.Y., and Leo Fisher, Fairlawn, N.J., assignors to Crest-Foam Corporation, Moonachie, N.J.

Continuation-in-part of Ser. No. 51,949, May 19, 1987, abandoned. This application Nov. 19, 1987, Ser. No. 122,371

Int. Cl.[4] H01R *1/06;* **C08J** *9/00*

U.S. Cl. 252—500 **30 Claims**



1. A three dimensional electrically conductive plastic foam structure comprising a polyurethane foam containing an effective amount for lowering the volume resistivity of said foam of tetracyanoethylene.

4,886,627
CONDUCTIVE STRUCTURES IN POLYMERS

Harald Gruber, Dresden; Andreas M. Richter, Halle-Neustadt; Egon Fanghänel, Halle; Hans-Klaus Roth, Leipzig; Heinz Friedrich, Leipzig, and Siegfried Maras, Leipzig, all of German Democratic Rep., assignors to VEB Metallurgieelektronik Leipzig, Leipzig, German Democratic Rep.

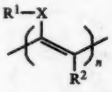
Filed Mar. 15, 1988, Ser. No. 168,348

Claims priority, application German Democratic Rep., Apr. 9, 1987, 301649

Int. Cl.[4] A01B *1/06*

U.S. Cl. 252—513 **6 Claims**

1. Method of treating polymers to make them electrically conductive, comprising exposing a poly(organylheteroacetylene) or a mixture of poly(organylheteroacetylenes) of the formula



to radiation of high energy density thereby to increase the temperature of the exposed polymers to 100° to 600° C., wherein the formula: X is sulfur or selenium; R^1 and R^2 each is alkyl of 1 to 12 carbon atoms or cycloalkyl of 3 to 10 carbon atoms or aralkyl of 7 to 15 carbon atoms or aryl of 6 to 18 carbon atoms or heterocyclyl of 2 to 10 identical or different heteroatoms or R^2 is hydrogen or a group R^3—Y, wherein Y is sulfur or selenium and R^3 is selected from the same alternatives as R^1 or any of R^1, R^2 and R^3 is substituted by a group selected from alkoxy, aralkoxy, aryloxy, heterocyclyloxy, alkylthio, aralkylthio, arylthio, heterocyclylthio, alkylseleno, aralkylseleno, arylseleno, heterocyclylseleno, the alkyl, aralkyl, aryl or heterocyclyl moieties, on which these groups are based, being selected from the same alternatives as R^1, cyano, fluorine, chlorine, bromine, iodine, nitro, carbonyl substituents with 1 to 15 carbon atoms, aminocarbonyl, carboxylate, ammonium groups, sulfonium groups, phosphonium groups; and wherein at least one of R^1 and R^2 of different monomer units of said poly(organylheteroacetylene) may be linked to one another directly or through methylene, benzylidene, or phenylene; and wherein n is at least 2.

4,886,628
PROCESS FOR THE PREPARATION OF AMINOCARBONYLMETHANOIC ACIDS OF PHOSPHORUS

Hans-Jerg Kleiner, Kronberg/Taunus, Fed. Rep. of Germany, assignor to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

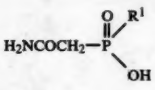
Continuation of Ser. No. 165,534, Mar. 8, 1988, abandoned. This application Oct. 19, 1988, Ser. No. 262,110

Claims priority, application Fed. Rep. of Germany, Mar. 10, 1987, 3707638

Int. Cl.[4] C07F *9/30, 9/38*

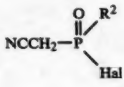
U.S. Cl. 56—15 **19 Claims**

1. A process for the preparation of aminocarbonyl acids of phosphorus of the general formula I



(I)

wherein R^1 means OH or C_1–C_3 alkyl which comprises reacting at a temperature in the range of from −30° to +100° C. a cyano halide of phosphorus of the general formula II



(II)

with substantially the stoichiometric amount of water, in formula II R^2 meaning a halogen having an atomic weight in the range of from 35 to 80 or a C_1–C_3 alkyl and Hal being a halogen having an atomic weight in the range of from 35 to 80.

4,886,629
PROCESS FOR THE PREPARATION OF FLUORINATED BENZENE SULFONYL FLUORIDES

Michael Van Der Puy, Cheektowaga, N.Y., assignor to Allied-Signal Inc., Morris Township, Morris County, N.J.

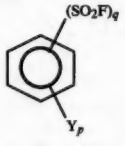
Filed Jun. 6, 1988, Ser. No. 203,171

Int. Cl.[4] C07C *155/00*

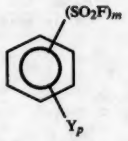
U.S. Cl. 562—826 **5 Claims**

1. A process for the preparation of a fluorinated benzene sulfonyl fluoride comprising the step of:

heating a benzene sulfonyl fluoride of the Formula



where Y is fluorine, chlorine, bromine, iodine, a methyl group, an ethyl group, or a propyl group; p is 0 to 3; and q is 2 to 6, in the presence of an alkali metal fluoride under conditions and for a time sufficient to provide a fluorinated benzene sulfonyl fluoride of the Formula



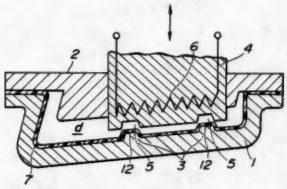
wherein x is 1 to 5; m=q−x; and Y and p are as defined above.

4,886,630

METHOD OF PRODUCING SKIN-COVERED PAD FOR SEAT

Takashi Sugiura; Ichiro Matsuura; Fumio Miyauchi, and Toyoharu Chiyoshi, all of Ayase, Japan, assignors to Ikeda Bussan Co., Ltd., Ayase City, Japan

Filed May 26, 1988, Ser. No. 200,802
Int. Cl.[4] B29C *51/00*
U.S. Cl. 264—46.6 6 Claims



1. A method of producing a skin-covered pad for a seat, comprising by steps:

(a) preparing a lower mold which has a cavity formed therein, said mold having projections on a bottom of said cavity;

(b) putting a bag-shaped outer skin member into said cavity, said skin member being thermally plastic;

(c) putting an upper mold on said lower mold to close said cavity, said upper mold having an aperture formed therethrough;

(d) projecting a press member into said cavity through said aperture, said press member having at its work head recesses which are shaped to match with said projections of the lower mold;

(e) pressing the recessed work head of the press member against said projections of the lower mold with an interposal of a part of the outer skin member therebetween;

(f) heating said work head of the press member thereby to soften said part of the outer skin member;

(g) separating said work head of the press member away from said projections of the lower mold; and

(h) pouring a liquid material for foamed plastic into said cavity and curing the same.

4,886,631

CELLULOSE ESTER HOLLOW FIBER MEMBRANE FOR PLASMA SEPARATION

Mitsuru Suzuki; Makoto Ohno, and Isamu Yamamoto, all of Otsu, Japan, assignors to Toyo Boseki Kabushiki Kaisha, Osaka, Japan

Division of Ser. No. 900,584, Aug. 26, 1986, Pat. No. 4,808,312.
This application Sep. 2, 1988, Ser. No. 239,686
Claims priority, application Japan, Jun. 10, 1986, 61-134035
Int. Cl.[4] B01D *13/04*
U.S. Cl. 264—49 3 Claims

1. A method comprising: producing a hollow fiber membrane made of a cellulose ester for separation of plasma, by extruding a spinning solution containing 20% by weight or more of a cellulose ester in an aprotic polar solvent having a boiling point of 150° C. or higher or a non-solvent through a tube in orifice nozzle together with an inner solution which is an aqueous solution of the same solvent or non-solvent as used for the spinning solution, and coagulating the extruded membrane in a coagulation bath under the following conditions:

$$0° C. < T_1 - T_2 \leqq 40° C.$$

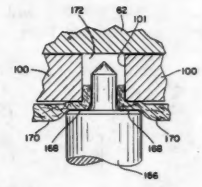
wherein T_1 is a temperature of extrusion and T_2 is a temperature in the coagulation bath, and the concentration of the solvent or non-solvent in the coagulation bath and in the inner solution: ≧50% by weight.

4,886,632

METHOD OF PERFORATING A NONWOVEN WEB AND USE OF THE WEB AS A COVER FOR A FEMININE PAD

Thomas P. Van Iten, Neenah; Howard A. Whitehead, Appleton, and Julie A. Schindel, Oshkosh, all of Wis., assignors to Kimberly-Clark Corporation, Neenah, Wis.

Continuation-in-part of Ser. No. 32,154, Mar. 27, 1987, abandoned, which is a division of Ser. No. 774,252, Sep. 9, 1985, abandoned. This application Aug. 11, 1988, Ser. No. 231,752
Int. Cl.[4] B28B *3/16, 1/48;* B32B *31/16*
U.S. Cl. 264—156 16 Claims



1. A method of perforating a nonwoven web of fibrous fabric comprising the steps of:

(a) directing said web through a nip defined by first and second movable members; and

(b) penetrating said web with a plurality of heated pins each having a shoulder which surrounds a penetrating point, said pins projecting outward from said first member and entering heated apertures formed in said second member causing fibers of said fabric to separate and enter into said apertures to form openings through said web, each of said shoulders having a diameter larger than the diameter of a corresponding aperture into which said point enters, each of said openings being surrounded by a consolidated ring formed by pressing said web between one of said heated pins and a corresponding aperture and between one of said shoulders and said second member, a combination of said openings and said consolidated rings exhibiting greater hydrophilic properties than the non-perforated surface of said web.

4,886,633

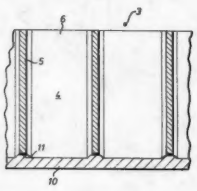
METHOD FOR MANUFACTURING STONES IN A PRESS

Cornelis Rook, AW Krimpen aan den Lek, and Willem Klein, ND Laren, both of Netherlands, assignors to Gebroeders Rock Beheer B.V., Krimpen aan den IJssel, Netherlands

Continuation of Ser. No. 901,541, Aug. 25, 1986, abandoned.
This application Dec. 13, 1988, Ser. No. 284,839
Claims priority, application Netherlands, Aug. 23, 1985, 8502316; Sep. 11, 1985, 8502484
Int. Cl.[4] B28B *3/02, 7/10;* B29C *33/42*
U.S. Cl. 264—219 17 Claims

1. A method of manufacturing stones with beveled edges in a press by arranging longitudinal axes of the stones vertically on a moulding plate comprising providing:

(a) a fixed mould having a plurality of moulding rooms each of which:
  (i) is bounded by upright walls including longitudinal walls and transverse walls;
  (ii) has a top and a bottom;
  (iii) is open at the top and at the bottom; and
  (iv) has two adjacent upright corners formed between the longitudinal walls and the transverse walls that are beveled to form chamfers on longitudinal faces of the stones;
(b) a movable stamp:
  (i) arranged above the fixed mould for movement up and down relative to the fixed mould and
  (ii) having beveled edges for forming chamfers on end faces of the stones;
(c) a movable table arranged beneath the fixed mould for movement up and down relative to the fixed mould;
(d) a conveyor for supplying empty product plates each of which has a flat upper surface to a position beneath the fixed mould; and
(e) a discharge for conveying away product plates carrying moulding mass shaped in the fixed mould, the method further comprising the steps of:
(f) closing the bottoms of the moulding rooms by positioning the moulding plate thereagainst, wherein the moulding plate is supported by the movable table and includes an upper surface which is provided with upright ribs for shaping beveled edges on end faces of the stones, and



wherein the upright ribs of the moulding plate are positioned to extend at least substantially under the upright longitudinal walls of the moulding rooms when the moulding plate is positioned at the bottoms of the moulding rooms; then
(g) filling the moulding rooms in the fixed mould with moulding mass; then
(h) moving the movable stamp downwardly to compress the moulding mass in the moulding rooms into a shaped moulding mass until the movable stamp is located at a distance from the movable table determined by corresponding stops provided on the movable table and on the movable stamp, thereby forming stones of constant height within the press, the stones having beveled edges formed on their end faces by the upright ribs extending at least substantially under the upright longitudinal walls of the moulding rooms; then
(i) removing the moulding plate from between the movable table and the fixed mould;
(j) simultaneously with step (i), moving the flat product plate into a ready position between the movable table and the fixed mould, in which position the product plate is supported by the movable table; and
(k) after steps (i) and (j), ejecting the shaped moulding mass from the moulding rooms onto the product plate by simultaneously moving the movable stamp and the movable table downwardly while maintaining the predetermined distance between the movable table and the movable stamp by means of the stops.

4,886,634

PROCESS AND APPARATUS FOR THE PRODUCTION OF AN EXTRUDED, STRETCHED, SEAMLESS TUBE

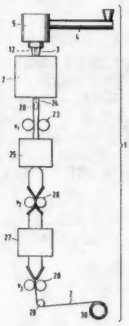
Hans Strutzel, and Peter Wink, both of Wiesbaden, Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

Filed Aug. 26, 1988, Ser. No. 236,912

Claims priority, application Fed. Rep. of Germany, Sep. 3, 1987, 3729449

Int. Cl.[4] B29C *47/90*

U.S. Cl. 264—560 **20 Claims**



1. A process for the production of a stretched, seamless tube which is continuously calibrated on the outside in one operation, comprising the steps of:
  feeding an annular parison of a partially crystalline polymer into a calibrator having a vacuum zone;
  producing a calibrated tube from the parison by means of vacuum calibration in which a pressure p_{il} equal to atmospheric pressure p_{atm} prevails inside the tube and a negative pressure p_{al} of from about 50 to 300 mbar lower than atmospheric pressure prevails on the outside of the tube in the vacuum zone;
  transporting the tube at a speed V_1 from the calibrator;
  separating and maintaining different pressures inside the tube on each side of the beginning of a stretching section by subjecting the inside of the tube downstream from the beginning of the stretching section to a pressure p_{i2} set from about 0.4 to 2.0 bar higher than atmospheric pressure;
  heating the tube in a heating zone to stretching temperature T_{ST}; and
  transporting the tube at a speed V_2 from the heating zone, wherein $V_2 > V_1$ so that the tube is stretched.

9. Apparatus for the production of an extruded, stretched, seamless tube from a partially crystalline polymer, which is continuously calibrated on the outside in one operation, comprising:
  an annular die for producing a parison;
  a calibrator and vacuum tank arranged after the annular die for producing a tube from the parison by vacuum calibration;
  a probe pipe with gas-flowing means running through the calibrator and vacuum tank almost up to a first tube-advancing means;
  a sealing element on a portion of the probe pipe after the calibrator so that different pressures can be maintained in the tube on each side of said sealing element, atmospheric pressure being maintained upstream and a pressure higher than atmospheric being maintained downstream;
  said first tube-advancing means advancing the tube at a speed V_1 through the calibrator and vacuum tank;
  a heating chamber arranged after the calibrator and vacuum tank for heating the tube to a stretching temperature; and
  second tube-advancing means arranged after the heating

chamber for advancing the tube at a speed V_2, wherein $V_2 > V_1$, so that the tube is stretched in said heating chamber.

4,886,635

GRIPPING TOOL FOR A DEVICE FOR THE REMOTE-CONTROLLED REMOVAL OF SAMPLES FROM A CONTAINER, IN PARTICULAR FROM A PRESSURE VESSEL OF A REACTOR

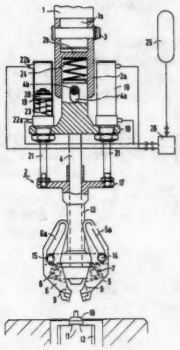
Josef Forster, Hirschaid, and Johann Selinger, Oberasbach, both of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Munich, Fed. Rep. of Germany

Filed Jul. 7, 1988, Ser. No. 216,137

Claims priority, application Fed. Rep. of Germany, Jul. 9, 1987, 8709485[U]

Int. Cl.[4] G21C *19/20*

U.S. Cl. 376—268 2 Claims



1. Gripping tool for a device for the remote-controlled removal of samples in housings with heads from a container, comprising a rigid mast having a first coupling part, a second coupling part opposite and associated with said first coupling part, a guide bar elastically bearing on said second coupling part in a telescoping manner, pivots disposed on said guide bar, at least two catches of a two-armed lever being disposed on said pivots and having a guide grooves formed therein, a bushing surrounding said guide bar having guide pins each engaging a respective one of said guide grooves, and at least one remotely controlled linear pressure medium drive moving said bushing in the direction of the longitudinal axis of said bushing for surrounding the head of the sample housing with said catches like tongs, said at least one drive including at least one cylinder disposed on said guide bar having a piston with a piston rod connected to said bushing.

4,886,636

METHOD OF CONTROLLING THE PORE MORPHOLOGY OF STRENGTHENED SILVER POWDER COMPACTS

Larry J. Gaudino, Greensboro, N.C., assignor to Technitrol, Inc., McKeesport, Pa.

Filed Jun. 13, 1988, Ser. No. 204,660

Int. Cl.[4] G22F *1/00*

U.S. Cl. 419—2 6 Claims

1. In the manufacture of a rigid porous network structure made by pressing and sintering silver prepared by the ion substitution process, the improvement which comprises heat treating the silver prior to pressing and sintering in order to increase the porosity of the structure.

4,886,637

PRESINTER TREATMENT FOR IRON POWDER ARTICLE FORMED WITH BORIDE ADDITIVE

William F. Jandeska, Jr., Rochester; Vadim Rezhets, West Bloomfield, and Carlo Ligotti, Romeo, all of Mich., assignors to General Motors Corporation, Detroit, Mich.

Filed Apr. 17, 1989, Ser. No. 342,764

Int. Cl.[4] B22F *1/00*

U.S. Cl. 419—12 4 Claims

4. In a method for manufacturing an iron alloy article comprising dispersed borocementite parties, said method comprising compacting a predominantly iron powder mixture containing carbon powder, nickel boride powder, iron boride powder and a vaporizable lubricant and heating the compact up to about 500° C. to vaporize the lubricant and thereafter to above about 1100° C. to sinter the powder to form a product article, whereupon during sintering the nickel boride powder and iron boride powder form a liquid phase and carbon and boron diffuse into the iron to form the borocementite particles, the improvement comprising

subjecting the compact to a presinter treatment following lubricant vaporization and prior to heating to sintering temperature, said treatment being carried out in a vacuum and comprising isothermally heating at a temperature between about 850° C. and 900° C. for between about 15 and 45 minutes, whereby iron oxide initially present on iron surfaces within the compact is dissociated and the resulting oxygen-bearing gas is purged prior to forming said liquid phase to increase borocementite formation during sintering.

4,886,638

METHOD FOR PRODUCING METAL CARBIDE GRADE POWDERS

Joseph J. Penkunas; Theodore E. Smith, both of Sayre, and Jack L. Burwick, York, all of Pa., assignors to GTE Products Corporation, Stamford, Conn.

Filed Jul. 24, 1989, Ser. No. 384,199

Int. Cl.[4] B22F *1/00*

U.S. Cl. 419—15 1 Claim

1. A method for producing metal carbide grade powders, said method comprising:

(a) dry milling metal carbide powder selected from the group consisting of tungsten carbide, titanium carbide, tantalum carbide, niobium carbide, vanadium carbide, chromium carbide, and combinations thereof to increase the surface area of the powder particles to result in essentially all of said powders being converted to single crystals;

(b) forming a mixture of the resulting dry milled carbide powder, a binder metal selected from the group consisting of cobalt, nickel, and combinations thereof, and a wax while heating said carbide powder, said binder metal and said wax to a temperature above the melting point of said wax and maintaining said temperature to result in a uniform distribution of said wax on said carbide and binder metal particles;

(c) forming a slurry of said mixture and water;

(d) attritor milling said slurry at a temperature below the melting point of said wax; and

(e) removing the water from the resulting attritor milled mixture and agglomerating said mixture to produce said metal carbide grade powder wherein a densified article made therefrom exhibits essentially no pores that are greater than about 10 micrometers in diameter after sintering at from about 1350° C. to about 1540° C.

4,886,639

CONSTRUCTION ELEMENTS PRODUCED BY POWDER METALLURGY

Gerhard Andrees, Munich; Josef Kranzeder, Erding, and Wilhelm Vogel, Aystetten, all of Fed. Rep. of Germany, assignors to MTU Motoren- und Turbinen-Union Muenchen GmbH, Munich, Fed. Rep. of Germany

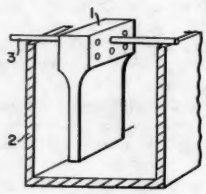
PCT No. PCT/DE86/00306, § 371 Date Apr. 30, 1987, § 102(e) Date Apr. 30, 1987, PCT Pub. No. WO87/00781, PCT Pub. Date Feb. 12, 1987

PCT Filed Jul. 29, 1986, Ser. No. 44,030

Claims priority, application Fed. Rep. of Germany, Jul. 31, 1985, 3527367

Int. Cl.[4] B22F *3/24*

U.S. Cl. 419—28 24 Claims



1. A method for producing a structural component having a complicated shape, a high dimensional accuracy and shape retaining stability and a high surface quality, made of powder metallurgically processable materials that may be molded and then sintered, comprising the following steps:

(a) mixing a powder of a metal alloy with a binder material to form a moldable mass,

(b) molding said moldable mass into said complicated shape,

(c) heating said complicated shape sufficiently to drive out said binder material to form a green blank,

(d) introducing said green blank into a sintering oven and performing a first sintering in said sintering oven at a temperature corresponding to about 50 to 70% of the solidus temperature of said metal alloy powder for a duration of about six minutes to maximally ten hours whereby a resulting sintered blank substantially does not shrink during said first sintering yet has a sufficient strength for being handled, and so that the sintered blank is not exposed to any surface reaction during said first sintering,

(e) freely suspending the sintered blank so that its surface zones are exposed and accessible for treatment in a second sintering, and

(f) performing a second sintering at a temperature within the range of about 1150° C. to about 1300° C. and for a length of time sufficient to cause a linear shrinking of said structural component while avoiding cracks and achieving a density within the range of 95% to 98% of the theoretical density.

4,886,640

HOT WORK TOOL STEEL WITH GOOD TEMPER RESISTANCE

Harrison A. Garner, Jr., Elverson; Raymond M. Hemphill, Wyomissing; John F. McGraw, Sinking Spring; Michael L. Schmidt, Reading; Bruce A. Smith, Reading, and David E. Wert, Reading, all of Pa., assignors to Carpenter Technology Corporation, Reading, Pa.

Filed Aug. 22, 1988, Ser. No. 234,901

The portion of the term of this patent subsequent to Aug. 1, 2006, has been disclaimed.

Int. Cl.[4] C22C *38/24*

U.S. Cl. 420—111 23 Claims

1. A hot work tool steel alloy having good temper resistance, in combination with good wear resistance and toughness, said alloy, in weight percent, consisting essentially of about

	w/o
Carbon	0.55 Max.
Manganese	1.5 Max.
Silicon	2.0 Max.
Chromium	3.5–6.0
Molybdenum	1.5–2.25
Vanadium	0.50–1.50

and the balance essentially Iron wherein % carbon $\geqq 0.09 \times$ % chromium.

4,886,641

ELECTRICAL CONTACT SPRING MATERIAL MADE OF COPPER BASE ALLOY OF HIGH STRENGTH AND TOUGHNESS WITH REDUCED ANISOTROPY IN CHARACTERISTICS

Takuro Iwamura, and Masao Kobayashi, both of Ohmiya, Japan, assignors to Mitsubishi Kinzoku Kabushiki Kaisha, Tokyo, Japan

Filed Apr. 20, 1988, Ser. No. 183,778

Claims priority, application Japan, Apr. 28, 1987, 62-105924; Dec. 17, 1987, 62-319933

Int. Cl.[4] C22C *9/00*

U.S. Cl. 420—470 11 Claims

1. An electrical contact spring material made of a copper base alloy having high strength and toughness and reduced anisotropy, said alloy consisting essentially of 2.2–5% Ti, 0.1–0.8% Co, 0.02–0.5% Cr, a total of from 0 to 0.6% of at least one element selected from the group consisting of Ni and Fe, and a total of from 0 to 0.5% of at least one solder adhesion improving component selected from the group consisting of Ca, Mg, Zn, Cd, Li, Zr, Si, Mn, Sn and Al, and the balance being Cu and incidental impurities, all percents being on a weight basis.

4,886,642

MEASUREMENT OF TOTAL IRON BINDING CAPACITY

Ross T. Starr, 74 Baillie Street, Horsham, Victoria, Australia

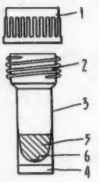
Division of Ser. No. 885,568, May 6, 1986, Pat. No. 4,735,904.

This application Mar. 31, 1988, Ser. No. 176,265

Claims priority, application Australia, Nov. 7, 1984, PG8017; Nov. 20, 1984, PG8209

Int. Cl.[4] G01N *33/20*

U.S. Cl. 422—58 20 Claims



1. A self-contained, one-tube article of manufacture for measuring the total iron binding capacity of blood serum or plasma comprising a container having a closed end, an open end and a liquid impermeable removable closure for forming a liquid impermeable seal between the container and closure, wherein the container is prepackaged to contain a measured quantity of a dried iron-saturated substance bonded to the interior surface of the container and a measured quantity of dried alumina, wherein the closure includes means for containing said measured quantity of alumina.

20. A one-tube method for measurement of total iron binding capacity using a self-contained, one-tube article of manufacture for use in the measurement of total iron binding capacity of blood serum or plasma, comprising a liquid impermeable poly-

ethylene cap which is adapted to screw on the threaded neck of a polystyrene tube which is closed at one end forming a liquid impermeable seal and has a rim forming a base which enables the tube to be free standing, in which the tube is prepackaged to contain a measured amount of washed and dried basic chromatographic grade alumina powder, and further characterized in that the cap contains a solid central projection which extends to a hemispherical hollow opening in which measured amount of an iron-saturating substance is bonded to the interior surface of the projection comprising the steps of:

(a) removing the cap containing the iron-saturating substance,

(b) adding a solvent to the tube containing the alumina followed by the sample of serum or plasma,

(c) replacing the cap,

(d) mixing the contents of the tube,

(e) allowing the alumia to settle, and

(f) measuring the iron content of the supernatant.

4,886,643

APPARATUS FOR PROPORTIONING REACTION MIXTURES

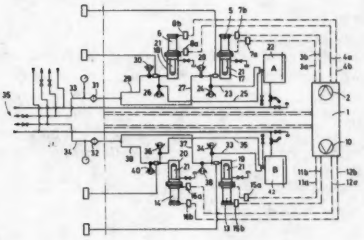
Norbert Feist, Hilchenbach, Fed. Rep. of Germany, assignor to Battenfeld Maschinenfabriken GmbH, Meinerzhagen, Fed. Rep. of Germany

Filed May 13, 1987, Ser. No. 49,708

Claims priority, application Fed. Rep. of Germany, May 15, 1986, 3616463

Int. Cl.[4] B01F *5/04, 15/02*

U.S. Cl. 422—133 **5 Claims**



1. An apparatus for proportioning reaction mixtures, comprising two first proportioning cylinders for proportioning a first of the components and two second proportioning cylinders for proportioning a second of the components into a mixing head, the proportioning cylinders each including proportioning pistons capable of being operated alternatingly for filling the proportioning cylinders with the component and subsequently ejecting the component from the proportioning cylinders, two first double-acting hydraulic cylinders for operating the proportioning pistons for the first two proportioning cylinders independently of each other and two second double-acting hydraulic cylinders for operating the proportioning pistons of the second two proportioning cylinders independently of each other, a first common hydraulic pump for driving the first two double-acting hydraulic cylinders and a second common hydraulic pump for driving the second two double-acting hydraulic cylinders, each of the first two hydraulic cylinders being connected to the first hydraulic pump by means of two connecting lines and each of the second two hydraulic cylinders being connected to the second hydraulic pump by means of two connecting lines, servo-controlled proportional valves provided in each of the connecting lines for controlling the quantity of hydraulic liquid conducted to the hydraulic cylinders, means for adjusting the control cycles of the proportional valves determining the ejection of the first component from the first two proportioning cylinders relative to each other so as to temporarily overlap and means for adjusting the control cycles of the proportional valves determining the ejection of the second component from the second two proportioning cylinders relative to each other so as to temporarily overlap, means for inversely controlling the rates of flow of the hydraulic liquid to the hydraulic cylinders for effecting ejection of the component by the two proportional valves during the overlap of the control cycles thereof, and means for controlling the two proportional valves together in such a way that a constant total rate of flow is obtained.

4,886,644

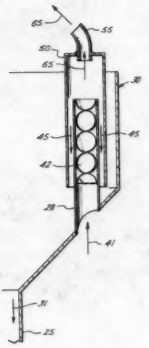
LIQUID DEGASER IN AN EBULLATED BED PROCESS

Ting Y. Chan, and James H. Colvert, both of Houston, Tex., assignors to Texaco Inc., White Plains, N.Y.

Filed Dec. 2, 1987, Ser. No. 127,851

Int. Cl.[4] B01J *8/20*

U.S. Cl. 422—140 **2 Claims**



2. A liquid degaser in combination with a high pressure reaction vessel adapted for the reaction of a fluid hydrocarbon feed with a hydrogen rich gas at elevated temperatures and pressures in the presence of a bed of a particulate solid catalyst, said reaction being the type wherein the gas and hydrocarbon feed are passed upwardly through the bed at velocities whereby the bed is expanded to a volume greater than its static volume and the particulate solid catalyst is put in a state of random motion and wherein the mixture of hydrocarbon feed, gas and catalyst constitute a catalytic reaction zone wherein minimum catalyst settling takes place, the upper portion of which is defined by a catalyst depleted zone substantially free of catalyst the upper portion of said catalyst depleted zone is defined by said liquid degaser comprising;

a generally vertical recycle conduit having an enlarged upper end in fluid communication with a phase separation zone and a lower end in fluid communication with means for recycling liquid from the catalyst depleted zone to the lower end of the catalytic reaction zone and a plurality of generally vertical riser conduits extending through the enlarged upper end having lower ends in fluid communication with said catalyst depleted zone and upper ends, the improvement to the recycle conduit comprising:

(a) tangential velocity inducing members in direct fluid communication with said riser conduit upper ends, and

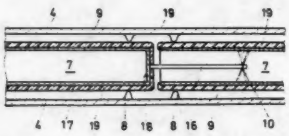
(b) cyclone separators in direct fluid communication with said tangential velocity inducing members.

4,886,645

OZONE GENERATOR

Melchior Fischer, Lieli, and Nazareno Gaiffi, Turgi, both of Switzerland, assignors to BBC Brown Boveri AG, Baden, Switzerland

Filed Oct. 27, 1988, Ser. No. 263,077
Claims priority, application Switzerland, Oct. 27, 1987, 4210878
Int. Cl.[4] B01J *19/08, 19/12*
U.S. Cl. 422—186.18 7 Claims



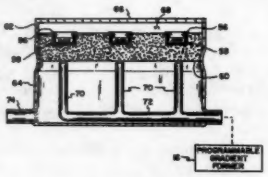
1. Ozone generator with a tubular outer electrode and a plurality of inner electrodes which exhibit a dielectric layer on their surface facing the outer electrode, with means for spacing the inner electrodes from the outer electrode and forming of an annular discharge gap and means for electrically connecting all electrodes to an alternating current source, wherein the inner electrodes comprise a plurality of cascaded mechanically decoupled electrode segments which are electrically connected to one another in groups, and each segment is supported spaced from the outer electrode independently of the segment immediately adjacent to it.

4,886,646

HANGING DROP CRYSTAL GROWTH APPARATUS AND METHOD

Daniel C. Carter, Huntsville, Ala., and Robbie E. Smith, Fayetteville, Tenn., assignors to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.

Filed Mar. 23, 1988, Ser. No. 172,101
Int. Cl.[4] C30B *7/02*
U.S. Cl. 422—245 16 Claims



1. An apparatus for growing crystals from dissolved crystalline material in a selected quantity of fluid comprising:

an enclosure:

fluid support means disposed for supporting said selected quantity of fluid in said enclosure;

a programmable gradient former for selectively generating a flow of control fluid having a selectively variable vapor pressure such that when said flow of control fluid is exposed to said selected quantity of fluid, solvent in said quantity of fluid is varied;

absorbent vapor diffusion means positioned in said enclosure, said vapor diffusion means being disposed to continuously absorb said flow of control fluid from said gradient former and exposing said selected quantity of fluid to said selectively variable vapor pressure; and

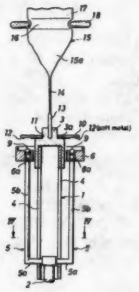
a discharge opening in said enclosure for passing control fluid therefrom.

4,886,647

SUPPORTING APPARATUS FOR SEMICONDUCTOR CRYSTAL ROD

Yasuhiro Ikeda, and Kouji Mizuishi, both of Annaka, Japan, assignors to Shin-Etsu Handotai Co., Ltd., Gunma, Japan

Filed Dec. 16, 1987, Ser. No. 133,791
Claims priority, application Japan, Apr. 27, 1987, 62-103820
Int. Cl.[4] C30B *13/00, 13/14, 35/00*
U.S. Cl. 422—250 11 Claims



8. For a semiconductor monocrystal rod being grown based on the floating zone method, having a vertically movable heating coil through which a polycrystal rod is positioned to pass and to be processed into a monocrystal rod, a lower portion of said rod being conical, a supporting apparatus for said rod comprising:

a horizontally shiftable support ring;

means for moving said support ring upward into contact with the conical portion of said rod, said support ring shifting horizontally into a centered horizontal position about said conical portion of said rod as said ring is moved into contact therewith; lock means including means for increasing frictional resistance for securing said ring into said centered position and

means for disengaging said lock means when said rod is not in contact with said shiftable support ring.

4,886,648

PROCESS FOR THE RECOVERY OF GERMANIUM FROM SOLUTIONS THAT CONTAIN IT

Francisco J. S. Menendez, La Moraleja; Fernando M. S. Menendez, Salinas; Antonio De La Cuadra Herrera, Madrid; Francisco A. Tamargo; Luis P. Lorenzo, both of Salinas; Matias R. Valcarcel, Piedras Blancas, and Vicente A. Fernandez, Madrid, all of Spain, assignors to Asturiana De Zinc, S.A., Madrid, Spain

Filed Jun. 29, 1988, Ser. No. 213,182
Claims priority, application Spain, Jul. 15, 1987, 8702072
Int. Cl.[4] C01G *17/00*
U.S. Cl. 423—92 11 Claims

1. A process for the recovery of germanium from an aqueous acidic solution containing germanium comprising;

(a) adding polyhydrocarboxylic compound, as a complexing agent for germanium, to said aqueous acidic solution forming an aqueous liquor; and liquid-liquid extracting the formed complex by contacting, at a temperature in the range of 15° to 40° C., the aqueous liquor with an organic solution, said organic solution comprising a water-immiscible organic diluent and an amine extractant, to thereby form an organic extract rich in germanium complex and an aqueous phase practically free of germanium;

(b) scrubbing with water said organic extract rich in germanium complex;

(c) treating said organic extract rich in germanium complex with an aqueous basic solution at a temperature in the

range of 15° C. to 40° C. to thereby dissociate the germanium complex and thereby transfer the polyhydroxycarboxylic compound and germanium as polygermanate, to the aqueous phase, and obtaining an organic solution practically free of both germanium and complexing agent wherein said organic solution practically free of germanium and complexing agent is ready to be used in step (a); and

(d) adding sulphuric acid to the basic aqueous solution product of step (c) to bring the pH value into the range of 8 to 11 to thereby precipitate germanium in the form of polygermanate out of the aqueous solution whereby the precipitate-free aqueous solution containing said complexing agent is available to be used again in step (a).

4,886,649

METHOD FOR THE PURIFICATION OF HYDROGEN SULFIDE-CONTAINING GASES

Zinfer R Ismagilov, Tsvetnoi prospekt, 17, kv. 36; Kirill I. Zamaraev, ulitsa Zhemchuzhnaya, 2, kv. 13; Sergei R. Khairulin, Tsvetnoi prospekt, 27, kv. 47, all of Novosibirsk; Tofik G. Alkhazov, prospekt Kirova, 40, kv. 39, Baku; Foat R. Ismagilov, ulitsa Rabkorov, 26, kv. 42, Ufa; Alexei A. Ivanov, ulitsa Tereshkovoi, 38, kv. 21, Novosibirsk; Georgy B. Barannik, ulitsa Uritskogo, 37, kv. 56, Novosibirsk; Mikhail A. Kerzhentsev, ulitsa Polevaya, 14, kv. 128, Novosibirsk; Valentin V. Nemkov, ploschad Shaumiana, 5, kv. 8, Astrakhan, and Valentin N. Parmon, ulitsa Tereshkovoi, 26, kv. 8, Novosibirsk, all of U.S.S.R.

Filed Feb. 8, 1989, Ser. No. 308,319

Claims priority, application U.S.S.R., Feb. 9, 1988, 4375327; Feb. 9, 1988, 4400744

Int. Cl.[4] C01B *17/16, 31/20*

U.S. Cl. 423—230 **4 Claims**

1. A method for the purification of hydrogen sulfide-containing gases, comprising:

forming a first bed of a granular catalyst containing 10–20% of magnesium chromite on aluminium oxide;

supplying a starting hydrogen sulfide-containing gas and oxygen which is used in an amount of 100–110% of the stoichiometric quantity necessary for oxidizing hydrogen sulfide to elemental sulfur to said first catalyst bed with the formation of a fluidized bed of said catalyst;

oxidizing hydrogen sulfide of said starting gas to elemental sulfur in the fluidized bed of said catalyst to purify the gases and to form gaseous sulfur and water vapour;

removing from said first bed of said catalyst said resultant sulfur, water vapour and unreacted hydrogen sulfide-containing starting gas and oxygen;

condensing the resultant gaseous sulfur and water vapour removed from said catalyst bed;

forming another catalyst bed for oxidizing hydrogen sulfide to elemental sulfur;

supplying the unreacted starting hydrogen sulfide-containing gas, oxygen as well as non-condensed gaseous sulfur and water vapour removed from said first catalyst bed to said other catalyst bed;

oxidizing hydrogen sulfide of said starting gas to elemental sulfur in said other catalyst bed at 140°–155° C.

4,886,650

NO REDUCTION USING SUBLIMATION OF CYANURIC ACID

Robert Perry, 2374 Research Dr., Livermore, Calif. 94550

Continuation-in-part of Ser. No. 859,951, May 5, 1986, Pat. No. 4,731,231, and a continuation-in-part of Ser. No. 154,247, Jan. 5, 1988. This application Mar. 15, 1988, Ser. No. 168,220

The portion of the term of this patent subsequent to Mar. 15, 2005, has been disclaimed.

Int. Cl.[4] C01B *21/00*

U.S. Cl. 423—235 **25 Claims**

1. A method of reducing the NO content of a gas stream comprising contacting the gas stream with HNCO in the presence of an amount of carbon monoxide effective to produce or regenerate H atoms, at a temperature effective for heat induced decomposition of HNCO and for resultant lowering of the NO content of the gas stream.

4,886,651

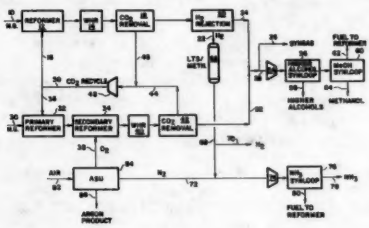
PROCESS FOR CO-PRODUCTION OF HIGHER ALCOHOLS, METHANOL AND AMMONIA

Nitin M. Patel, and Shoou-I Wang, both of Allentown, Pa., assignors to Air Products and Chemicals, Inc., Allentown, Pa.

Filed May 18, 1988, Ser. No. 195,576

Int. Cl.[4] C01C *1/04;* **C07C** *29/15*

U.S. Cl. 423—359 **10 Claims**



1. An integrated process for the production of higher alcohols, methanol and ammonia comprising the steps of:

(a) catalytically reforming a first methane-containing stream with steam and carbon dioxide to form a first hydrogen and carbon monoxide-containing synthesis gas;

(b) removing carbon dioxide from said first synthesis gas and recycling at least a portion of the carbon dioxide to said reformation;

(c) rejecting at least a portion of the hydrogen content of said first synethsis gas to produce a first carbon monoxide-rich synthesis gas and a hydrogen stream;

(d) at least partially catalytically reforming a second methane-containing stream with steam and carbon dioxide to form an initial methane, hydrogen and carbon monoxide-containing synthesis gas and further reforming said initial synthesis gas by partial oxidation with an oxygen-enriched gas to result in a second hydrogen and carbon monoxide-containing synthesis gas;

(e) removing carbon dioxide from said second synthesis gas and recycling at least a portion of the carbon dioxide to said catalytic reformation of step (d);

(f) combining said hydrogen stream with a nitrogen-rich stream and catalytically reacting the combined stream to produce ammonia;

(g) combining said first and second synthesis gas streams and catalytically reacting them to produce higher alcohols and a purge stream of residual unreacted synthesis gas at an elevated pressure; and

(h) reacting said purge stream to produce methanol.

4,886,652

PRODUCTION OF METAL CARBIDES

Gopala Krishnan, Sunnyvalle; Michael Gusman, Palo Alto; Sylvia M. Johnson, Piedmont, all of Calif.; David J. Rowcliffe, Stockholm, Sweden, and Hajime Nakano, Osaka, Japan, assignors to Osaka Gas Co., Ltd., Osaka, Japan

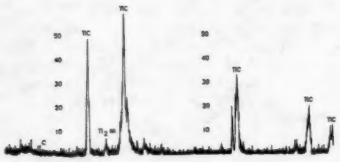
Continuation-in-part of Ser. No. 903,742, Oct. 27, 1986, abandoned. This application Apr. 22, 1988, Ser. No. 185,132

Int. Cl.[4] C01B *31/30, 31/36*

U.S. Cl. 423—439 **7 Claims**

1. A method of producing a porous carbide of at least one of the metals silicon, titanium and vanadium which comprises the steps of providing a mixture of solid particles, about 0.05 to about 10 mm in diameter, of carbon and of at least one of such

metals and an organic binder which volatilizes or dissociates upon heating and leaves no substantial amount of coke, shaping a mass of the mixture to form a shaped body, heating the shaped body by application of heat so as to raise the temperature rapidly from a temperature at which a solid state reaction



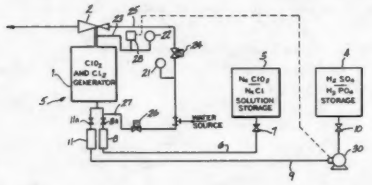
between the solid particles starts or from a temperature lower than that to a temperature at which the metal or metals are in the liquid state and holding at such a temperature to cause at least a substantial portion of the liquid metal to react with the carbon to form a carbide, such product being substantially free of coke resulting from heating the binder.

4,886,653

PROCESS AND APPARATUS FOR PRODUCING AN AQUEOUS SOLUTION CONTAINING CHLORINE DIOXIDE AND CHLORINE

Kenneth E. Gasper, Leawood, and Philip A. Vella, Lenexa, both of Kans., assignors to Olin corporation, Cheshire, Conn.

Filed Mar. 25, 1988, Ser. No. 173,520
Int. Cl.[4] C01B *11/02*; G01N *7/00*
U.S. Cl. 423—478 **20 Claims**



1. A process for the production of an aqueous solution containing chlorine dioxide and chlorine, which comprises:

(a) feeding to a reaction zone a first reactant stream comprising an aqueous solution containing an alkali metal chlorate and an alkali metal chloride;

(b) feeding to said reaction zone a second reactant stream comprising sulfuric acid, or an admixture of sulfuric acid and phosphoric acid;

(c) mixing said first and second reactant streams in said reaction zone; said streams being fed into said reaction zone at rates sufficient to form a reaction product stream comprising an aqueous solution of chlorine dioxide and chlorine in said reaction zone;

(d) transferring said resultant reaction product stream from the reaction zone to another location by educting the reaction product stream from the reaction zone by means of a vacuum generated by the flow of dilution water through an eductor;

(e) sensing the level of vacuum in said reaction zone;

(f) stopping the feeding of said second reactant stream for a predetermined time period when the level of vacuum detected in said reaction zone falls below a predetermined control level indicative of ClO_2 autodecomposition, said stopping of said second reactant feed stream causes said vacuum to return to the above predetermined control level; and

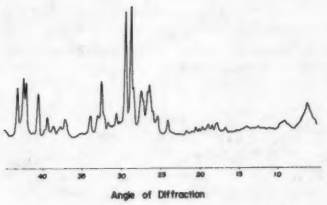
(g) resuming said steps (b), (c) and (d) after said predetermined time period has ended.

4,886,654

PROCESS FOR PRODUCING BARIUM TITANATES

Akihito Ohga, and Akira Itani, both of Ichihara, Japan, assignors to Mitsui Petrochemical Industries, Ltd., Tokyo, Japan

Filed Jun. 30, 1988, Ser. No. 213,835
Claims priority, application Japan, Jul. 2, 1987, 62-163975
Int. Cl.[4] C01G *23/00*
U.S. Cl. 423—598 **8 Claims**



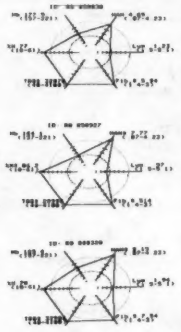
1. A process for producing barium titanates which comprises admixing a titanium alkoxide with a barium salt of a carboxylic acid having 5 carbon atoms or less in the presence of an organic solvent comprising ethylene glycol monomethyl ether to provide a solution, bringing said solution into contact with water to form a gelated product, and drying and calcining said gelated product.

4,886,655

METHOD OF DETECTING INFECTION OR IMMUNITY IN RUMINANTS

John F. T. Griffin, Dunedin, New Zealand, assignor to The University of Otago, Dunedin, New Zealand

Filed Nov. 28, 1986, Ser. No. 935,896
Claims priority, application New Zealand, Dec. 2, 1985, 214400
Int. Cl.[4] G01N *1/00*
U.S. Cl. 424—2 **13 Claims**



1. A method of detecting infection in a ruminant, said method comprising the steps of:

(a) obtaining a sample of blood from said ruminant;

(b) conducting an assay of mononuclear cell function;

(c) measuring a parameter of inflammation of the ruminant from the blood in said sample; and

(d) comparing the results obtained in steps (b) and (c) with a predetermined database to establish the infective status of said ruminant.

4,886,656

AGRICULTURAL COMPOSITION WITH REDUCED TOXICITY TO FISHES AND SHELLFISHES

Hisashi Obayashi, Gamou; Chikara Tanabayashi, Suita; Akiyoshi Asaka, Kyoto, and Yukio Gotou, Suita, all of Japan, assignors to Takeda Chemical Industries, Ltd., Osaka, Japan

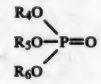
Continuation of Ser. No. 821,179, Jan. 22, 1986, abandoned. This application Nov. 20, 1987, Ser. No. 124,391

Claims priority, application PCT Int'l Appl., Jan. 24, 1985, PCT/JP85/00027

Int. Cl.[4] A01N *43/08, 57/10*

U.S. Cl. 424—10 10 Claims

1. An agricultural composition, with reduced toxicity to fish and shellfish, which consists essentially of 0.01 to 10 parts of a lipophilic agriculturally-active constituent relative to 100 parts of the total composition selected from the group consisting of carbofuran and carbamate type insecticides and an organic liquid in which said active constituent has a partition coefficient versus water of not less than 10^2, said organic liquid being present in an amount which is effective to reduce the toxicity of the agriculturally active constituent to fish and shellfish wherein said organic liquid is a phosphate of the formula:



in which each of R_4, R_5 and R_6 are alkyl of 3 to 12 carbon atoms, chlorinated alkyl of 1 to 4 carbon atoms or phenyl.

4,886,657

METHOD FOR PREVENTING PERIODONTITIS

Perry A. Ratcliff, 7125 E. Lincoln Dr., Scottsdale, Ariz. 85253

Division of Ser. No. 88,609, Aug. 24, 1987, Pat. No. 4,818,519, which is a continuation-in-part of Ser. No. 24,329, Mar. 10, 1987, Pat. No. 4,837,009, which is a continuation of Ser. No. 947,079, Dec. 29, 1986, Pat. No. 4,689,715, which is a continuation of Ser. No. 17,241, Dec. 29, 1986, Pat. No. 4,696,811, which is a continuation of Ser. No. 846,342, Mar. 31, 1986, abandoned, which is a continuation of Ser. No. 636,022, Jul. 30, 1989, abandoned. This application Dec. 2, 1988, Ser. No. 278,721

The portion of the term of this patent subsequent to Aug. 25, 2004, has been disclaimed.

Int. Cl.[4] A61K *7/20*

U.S. Cl. 415—53 8 Claims

1. A method for preventing periodontitis in the oral cavity, said method comprising the step of decreasing the anaerobic bacterial population and increasing the aerobic bacterial population within the oral cavity by applying stabilized chlorine dioxide in aqueous solution having a concentration of at least 0.005%.

4,886,658

ORAL TREATMENT METHOD FOR REDUCING PLAQUE WITH REDUCED STAINING

Duane L. Charbonneau, Middletown; Debra J. Moore, and Joel I. Shulman, both of Cincinnati, all of Ohio, assignors to The Procter & Gamble Company, Cincinnati, Ohio

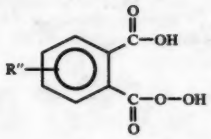
Filed Dec. 14, 1988, Ser. No. 284,262

Int. Cl.[4] A61K *7/16, 7/20, 7/22*

U.S. Cl. 424—53 23 Claims

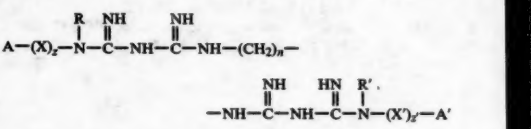
1. A method for treating or preventing dental plaque, or gingival or periodontal diseases of the oral cavity in humans or lower animals, said method comprising topically applying to the oral surfaces of the teeth or dentures of humans or lower animals:

(a) a safe and effective amount of a monoperoxyphthalate compound having the structure:



or the pharmaceutically acceptable salts or esters thereof, wherein R" is one or more substituents compatible with the peroxy acid functionality of the aromatic ring; and

(b) a safe and effective amount of an anti-plaque bis-biguanide compound having the structure:



or the pharmaceutically-acceptable salts thereof, wherein A and A' each represent either (1) a phenyl radical which optionally is substituted by an alkyl or alkoxy group containing from 1 to about 4 carbon atoms, a nitro group, or a halogen atom; (2) an alkyl group containing from 1 to about 12 carbon atoms; or (3) alicyclic groups containing from 4 to about 12 carbon atoms; X and X' each represent an alkylene radical containing from 1 to 3 carbon atoms; z and z' each can be either 0 or 1; R and R' each represent either hydrogen, an alkyl radical containing from 1 to about 12 carbon atoms, or an aralkyl radical containing from 7 to about 12 carbon atoms; n is an integer from 2 to 12 inclusive.

4,886,659

COLOR PRODUCTION

David A. Baines, Ely; Paul K. Filby, Bury St. Edmunds, and Marek P. J. Kierstan, Whittlesford, all of England, assignors to Dalgety U.K. Limited, London, England

Filed Feb. 16, 1988, Ser. No. 155,976

Claims priority, application United Kingdom, Feb. 18, 1987, 8703718

Int. Cl.[4] A61K *7/021*

U.S. Cl. 424—63 21 Claims

1. A process of producing a distinctive color comprising the steps of providing an aqueous Maillard reaction mixture obtained from Maillard reactants comprising (a) an aldose or ketose sugar or Maillard intermediate derived from said sugar, and (b) an amino acid; and reacting the aqueous mixture at a temperature of at least 100° C. under drying conditions whereby substantially all the water is rapidly evaporated to yield a dry product having a color which is distinctive relative to the aqueous mixture.

4,886,660

SHINE HAIR CONDITIONER

Amrit Patel, Dayton; Frank Schebece, Edison, both of N.J., and Harry Greenland, Wahroongha, Australia, assignors to Colgate-Palmolive Company, Piscataway, N.J.

Filed Jun. 11, 1987, Ser. No. 62,032

Int. Cl.[4] A61K *7/08, 7/06*

U.S. Cl. 424—70 14 Claims

1. A stable shine hair conditioner composition consisting essentially of about 0.375 tp 2.5% by weight of a C_{14}–C_{22} alkyl trimethyl quaternary ammonium compound, about 0.25 to 2.5% by weight of a nonionic water soluble cellulose polymer, about 1 to 10% by weight of a C_{14}–C_{22} alkanol, about 0.2 to 1.5% by weight mineral oil or glyceryl monostearate, about 0.1 to 1% by weight of a copolymer of polyvinyl pyrrolidone and vinyl acetate, and about 0.2 to 2% by weight of a plasticizer

selected from the group consisting of lanolin acetate, water soluble lanolin, glycerine and propylene glycol, in about 80 to 97.5% by weight of an aqueous carrier, said composition being in the form of an emulsion and having a pH of about 2.5 to 5.5

4,886,661

DIORGANOPOLYSILOXANE DOSAGE FORMS FOR THE CONTROLLED RELEASE OF IODINE VALUES

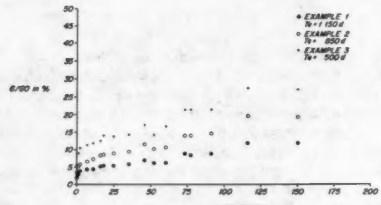
Cyprien Guy, L'Hay les Roses; Alain Fisch, Paris; Johany Haggiage, Lyon; Hugues Porte, Caluire; Thierry Prazuck, Paris, and Ghislaine Torres, Lyon, all of France, assignors to Rhone-Poulenc Chimie, Courbevoie, France

Filed Feb. 26, 1988, Ser. No. 161,443

Claims priority, application France, Feb. 26, 1987, 87 02882

Int. Cl.[4] A61K *31/73;* A01N *59/12*

U.S. Cl. 424—78 17 Claims



1. A heat-vulcanizable silicone composition for the controlled release of iodine values, comprising (A) a diorganopolysiloxane matrix resin containing at least two vinyl groups bonded to silicon per molecule and having a viscosity of at least 500,000 mPa.s at 25° C.; (B) at least one organohydropolysiloxane containing at least three hydrogen atoms bonded to silicon per molecule; (C) a reinforcing amount of a filler material therefor (D); a catalytically effective amount of a platinum group metal catalyst; and (E) a therapeutically effective amount of at least one water soluble, nontoxic, organic and/or inorganic iodine compound which is in solid or liquid state at ambient temperature, said iodine compound being dispersed homogeneously through the composition and not inhibiting curing of the composition into an elastomer.

4,886,662

USE OF ALPHA-TERPINEOL AS INSECT ATTRACTANT

Richard A. Wilson, Westfield, N.J.; Jerry F. Butler, Gainesville, Fla.; Donald A. Withycombe, Lincroft, N.J.; Braja D. Mookherjee, Holmdel, N.J.; Ira Katz, West Long Branch, N.J., and Kenneth R. Schrankel, Tinton Falls, N.J., assignors to International Flavors & Fragrances Inc., New York, N.Y. and The University of Florida, Gainesville, Fla.

Continuation of Ser. No. 930,419, Nov. 14, 1986, abandoned, which is a continuation-in-part of Ser. No. 879,351, Jun. 27, 1986, Pat. No. 4,801,448. This application May 6, 1988, Ser. No. 190,825

Int. Cl.[4] A01N *25/00*

U.S. Cl. 424—84 1 Claim

1. A method of attracting female Mediterranean sand flies (*Phlebotomus papatasi*) to an insect trap comprising the step of exposing the environment surrounding said trap to an insect attractant-containing polymer which consists of a mixture of a polymer and from about 1% up to about 45% by weight of said polymer of alpha-terpineol, said polymer being compatible with said alpha-terpineol.

4,886,663

SYNTHETIC HEAT-STABLE ENTEROTOXIN POLYPEPTIDE OF *ESCHERICHIA COLI* AND MULTIMERS THEREOF

Richard A. Houghten, Solana Beach, Calif., assignor to Scripps Clinic and Research Foundation, La Jolla, Calif.

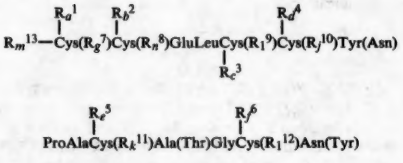
Continuation-in-part of Ser. No. 455,265, Jan. 3, 1983, Pat. No. 4,545,931. This application Dec. 12, 1983, Ser. No. 559,469

The portion of the term of this patent subsequent to Jul. 29, 2003, has been disclaimed.

Int. Cl.[4] A61K *39/108;* C07K *7/10*

U.S. Cl. 424—88 19 Claims

1. An antigenic synthetic polypeptide multimer comprising a plurality of polypeptide repeating units bonded together (1) head-to-tail through an amide bond formed between the amine group of the amino-terminal residue of a first polypeptide repeating unit and the carboxyl group of the carboxy-terminal residue of a second polypeptide repeating unit, or (2) by intramolecular interpolypeptide cystine disulfide bonds formed between Cys residues of said polypeptide repeating units, said synthetic multimer having at least about 10 percent of the antigenicity of that of biologic heat-stable enterotoxin of *Escherichia coli* and capable of inducing antibodies to said enterotoxin, and having thin layer chromatographic and electrophoretic mobilities different from said biologic heat-stable enterotoxin, said repeating units including the amino acid residue sequence, taken from left to right and in the direction from amino-terminus to carboxy-terminus, represented by the formula:



wherein the three specific amino acid residues in parentheses are each an alternative to the immediately preceding amino acid residue in said sequence;

a–f and g–l are integers each having a value of zero or one, with the proviso that if the value of any of a–f or g–l is zero, the corresponding $R_{a-f}{}^{1-6}$- or $R_{g-l}{}^{7-12}$-group is absent, and when an $R_{a-f}{}^{1-6}$-group is absent the sulfur atom of the respective Cys residues having an absent $R_{a-f}{}^{1-6}$-group forms a cystine disulfide bond, while if the value of said a–f or g–l is one, said corresponding $R_{a-f}{}^{1-6}$- or $R_{g-l}{}^{7-12}$-group is present;

said $R_{a-f}{}^{1-6}$-groups when taken individually, are the same or different moieties bonded to the sulfur atom of the respective Cys residues of the formula and are selected from the group consisting of hydrogen, an alkyl group containing 1 to about 4 carbon atoms, and a substituted alkyl group containing 2 to about 20 carbon atoms;

said $R_{g-l}{}^{7-12}$-groups are alternative Ser amino acid residues to each immediately preceding Cys residue shown in the formula;

at least two of a–f and two of g–l are zero and two Cys residues are present with the proviso that said synthetic polypeptide contains at least one intramolecular cystine disulfide bond formed from the at least two Cys residues present; and

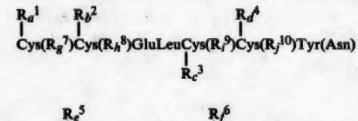
"m" is an integer having the value of zero or one with the proviso that if "m" is zero $R_m{}^{13}$ is absent, and if "m" is one, $R_m{}^{13}$ is a linking group, the acyl portion of a carboxylic acid containing 1 to about 20 carbon atoms that forms an amide bond with the amine of the amino-terminal residue, an amino acid residue, or a polypeptide chain of amino acid residues wherein the amino acid residues of said polypeptide are taken from left to right and in the

direction from amino-terminus to carboxy-terminus, and selected from the group consisting of

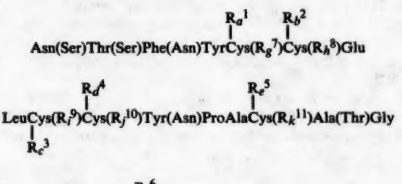
(a) Tyr;

(b) Asn(Ser)Thr(Ser)Phe(Asn)Tyr;

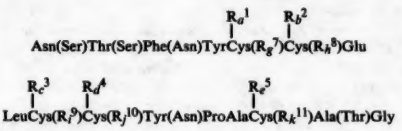
(c)



(d)



(e)



(f) MetValIleIleThrPheMetSerGlyGluThrPheGlnVal-GluValProGlySerGlnHisIleAspSerGlnLysAsn-(Ser)Thr(Ser)Phe(Asn)Tyr;

(g) TyrThrGluSerMetAlaGlyLysArgGlyAsn(Ser)Thr-(Ser)Phe(Asn)Tyr;

(h) TyrThrGluSerMetAlaGlyLysArgGluMet-ValIleIleThrPheMetSerGlyGluThrPheGlnVal-GluValProGlySerGlnHisIleAspSerGlnLysAsn-(Ser)Thr(Ser)Phe(Asn)Tyr;

(i) MetValIleIleThrPheMetSerGlyGluThrPheGlnVal-GluValProGlySerGlnHisIleAspSerGlnLys;

(j) TyrThrGluSerMetAlaGlyLysArgGly; and

(k) TyrThrGluSerMetAlaGlyLysArgGluMet-ValIleIleThrPheMetSerGlyGluThrPheGlnVal-GluValProGlySerGlnHisIleAspSerGlnLys

wherein the immediately above parenthesized amino acid residues $R_{a-f}{}^{1-6}$ and $R_{g-l}{}^{7-12}$ are as before defined;

said polypeptide having at least about 10% of the antigenicity of that of biologic heat-stable enterotoxin of *Escherichia coli* and having thin layer chromatographic and electrophoretic mobilities different from said biologic heat stable enterotoxin.

4,886,664

LOW-WATER-ACTIVITY INOCULA FOR BIOLOGICAL CONTROL

Gerard Jung, Montlhery, and Jacques Mugnier, Lyon, both of France, assignors to Rhone-Poulenc, S.A., Paris, France

Filed Jun. 8, 1983, Ser. No. 502,244

Claims priority, application France, Jun. 18, 1982, 82 10636; Apr. 1, 1983, 83 05442; Apr. 1, 1983, 83 05443

Int. Cl.[4] C12N *1/20, 1/04, 1/14;* A61K *37/00*

U.S. Cl. 424—93 **53 Claims**

1. A storage-stable inoculum useful in biological control comprising:

(a) a culture medium containing:

(i) a microorganism selected from the group consisting of bacteria and fungi;

(ii) a hydrocarbon source selected from the group consisting of sugars, alcohols, diglycosides, polyglycosides, and polysaccharides;

(iii) a mineral salt; and

(iv) a nitrogen source; and

(b) a cross-linked biodegradable polymer; wherein the culture medium and biodegradable polymer have been admixed, subjected to a cross-linking treatment so as to at least partially cross-link the polymer, and dried to reduce the water activity to less than 0.3, said inoculum having a long storage life greater than 100 days when stored at 28° C.

4,886,665

COMPOSITIONS OF OATS AND NETTLE EXTRACTS TO BE USED AS A FOOD ADDITIVE OR PHARMACEUTICAL PREPARATION IN HUMAN HEALTH CARE

Joseph Kovacs, Geneva, Switzerland, assignor to Arcopharma Ltd., Geneva, Switzerland

Filed Mar. 11, 1987, Ser. No. 24,446

Int. Cl.[4] A61K *35/78;* A23L *1/28;* B09B *3/00*

U.S. Cl. 424—195.1 **15 Claims**

1. A nutritional supplement for regular alimentary or external assimilation comprising an admixture of oats and nettle (Urtica) extract.

4,886,666

PHARMACEUTICAL COMPOSITION FOR INHIBITING VIRUSES AND INCREASING IMMUNE FUNCTION (PII)

Yaguang Liu, 67-08 168th St., Flushing, N.Y. 11365

Filed Jan. 27, 1987, Ser. No. 6,736

Int. Cl.[4] A61K *35/78, 31/70*

U.S. Cl. 424—195.1 **5 Claims**

1. A pharmaceutical composition for treating viruses comprising:

polysaccharide of Wang QI: 40–95 wt. %;

Banlankensu: 1–30 wt. %;

Yejuhua-flavonoid: 1–30 wt. %; and

Guanzhongsu: 1–30 wt. %.

4,886,667

EXTERNAL PREPARATION COMPOSITION

Kanshiro Kitagaki; Keiko Ebihara, both of Hachioji; Shigeo Morioka, Yokohama; Takao Nakamura, Urawa, and Taizo Okada, Urayasu, all of Japan, assignors to Sato Pharmaceutical Co., Ltd., Tokyo, Japan

Filed Nov. 28, 1986, Ser. No. 935,985

Claims priority, application Japan, Nov. 27, 1985, 60-264993

Int. Cl.[4] A01N *65/00, 43/08*

U.S. Cl. 424—195.1 **5 Claims**

1. A method of treating an infectious skin disease caused by at least one of bacteria and fungi comprising applying externally to skin of a patient in need thereof a pharmaceutical preparation comprising an antibacterial or antifungal effective amount of at least one of ratanhia extract and ratanhiaphenol in

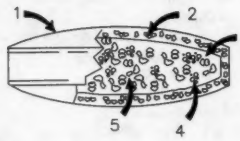
combination with at least one pharmaceutically acceptable additive.

4,886,668

MULTIPARTICULATE CONTROLLED POROSITY OSMOTIC PUMP

John L. Haslam, and Gerald S. Rork, both of Lawrence, Kans., assignors to Merck & Co., Inc., Rahway, N.J.

Filed Sep. 24, 1987, Ser. No. 100,676
Int. Cl.[4] A61K *31/55*
U.S. Cl. 424—424 22 Claims



1. A multiparticulate osmotic pump, for the controlled release of diltiazem L-malate to an environment of use, said pump comprising:

(I) a carrier medium which does not maintain its integrity in the environment of use;

(II) a multiple of tiny osmotic pump elements each comprising:

(A) a core which comprises diltiazem L malate and between 80 and 150 percent by weight of sodium bitartrate surrounded by

(B) a rate controlling water insoluble wall, having a fluid permeability of 6.96×10^{-18} to $6.96\times 10^{\times 14}$ cm^3 sec/g and a reflection coefficient of less than 0.5, prepared from:

(i) a polymer permeable to impermeable to solute and

(ii) 0.1 to 60% by weight, based on the total weight of (i) and (ii), of at least one pH insensitive pore forming additive dispersed throughout said wall,

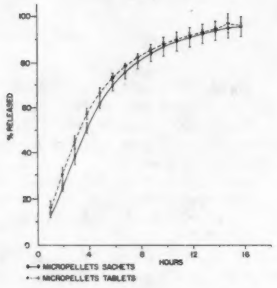
wherein the total amount of diltiazem L-malate in all of the osmotic pump elements is a therapeutically effective amount.

4,886,669

GALENICAL FORMULATION

Kimon Ventouras, Le Lignon, Switzerland, assignor to Zyna SA, Nyon, Switzerland

Filed Nov. 25, 1987, Ser. No. 125,604
Claims priority, application United Kingdom, Nov. 27, 1986, 8628359
Int. Cl.[4] A61K *9/26*
U.S. Cl. 424—469 20 Claims



1. A water-dispersible tablet comprising

(a) microparticles which contain at least one pharmaceutically active substance

(b) at least one disintegrant and

(c) a swellable material which is able to generate a high viscosity when coming into contact with water and which is selected from the group consisting of guar gum, xanthan gum, alginates, dextran, pectins, polysaccharides, sodium or calcium carboxymethylcellulose, hydroxypropylcellulose and hydroxypropylmethylcellulose;

which tablet disintegrates rapidly in water forming a homogeneous suspension of high viscosity that can easily be swallowed.

4,886,670

ANTI-VIRAL COMPOSITIONS

David F. Horrobin, Kentville, Nova Scotia, Canada, assignor to Efamol Limited, London, England

Continuation of Ser. No. 60,857, Jun. 12, 1987, abandoned, which is a continuation of Ser. No. 939,965, Dec. 10, 1986, abandoned, which is a continuation of Ser. No. 846,094, Mar. 31, 1986, abandoned, which is a continuation of Ser. No. 743,394, Jun. 11, 1985, abandoned, which is a continuation of Ser. No. 628,270, Jul. 6, 1984, abandoned. This application Feb. 23, 1988, Ser. No. 159,128
Claims priority, application United Kingdom, Jul. 27, 1983, 8320203
Int. Cl.[4] A61K *33/14, 31/62, 31/52, 31/19*
U.S. Cl. 424—677 7 Claims

4. A composition as claimed in claim 1 containing from 0.2 to 10% by weight of said acyclovir.

4,886,671

METHOD OF COMBATING DUTCH ELM DISEASE

John Cryer, 4305 S. Atlantic Ave., New Smyrna Beach, Fla. 32069

Continuation-in-part of Ser. No. 442,529, Nov. 18, 1982, abandoned. This application Oct. 25, 1984, Ser. No. 664,560
Int. Cl.[4] A01N *55/02, 59/16*
U.S. Cl. 424—641 6 Claims

1. A process for counteracting Dutch elm disease in living elm trees which are susceptible to said disease which comprises injecting into the trunk of the tree beneath the cambium layer a quantity of a solution which is non-pytotoxic to elm trees and consists essentially of a solution of one part by weight of a zinc salt in the form of zinc chloride dissolved in one part by weight of water and mixed with one part by weight of dimethyl sulfoxide, the quantity of said solution being at least 5 cc per inch of trunk girth and being sufficient to counteract Dutch elm disease and the quantity of dimethyl sulfoxide being sufficient to enhance the penetration of said solution in the living tissues of the tree, and the composition being such that the zinc chloride is not precipitated from its solution in water.

4,886,672

PROCESS FOR THE LIQUEFACTION OF BEETS AND CHICORY ROOTS BY ENZYMATIC HYDROLYSIS AND LIQUID HYDROLYSATE OBTAINED

Regis J. M. P. de Baynast de Septfontaines, Versailles; Francois E. M. E. Brouard, Orleans; Jean-Luc A. G. Baret, Moret-sur-Loing; Yvon G. A. J. M. Gicquiaux, Saint-Witz, all of France, and Hans S. Olsen, Holte, Denmark, assignors to Sucre Recherches et Developpement, Paris Cedex, France and Novo Industri A/S, Bagsvaerd, Denmark

PCT No. PCT/FR87/00265, § 371 Date Mar. 2, 1988, § 102(e) Date Mar. 2, 1988, PCT Pub. No. WO88/00243, PCT Pub. Date Jan. 14, 1988
PCT Filed Jul. 7, 1987, Ser. No. 171,006
Claims priority, application France, Jul. 7, 1986, 86 09841
Int. Cl.[4] A23L *1/214*
U.S. Cl. 426—48 15 Claims

1. A process for the liquefaction of beets or chicory roots, comprising the following stages:

(a) grinding washed beets or washed chicory roots to provide a ground product;
(b) adding to and mixing with said beets or chicory roots during or after their grinding in stage (a) a mixture of enzymes comprising SPS-ase, cellulase and cellobiase, said enzymes being employed, based on activity units per kg of dry matter contained in the beets or chicory roots, of 15 to 800 SPS-ase, 380 to 42000 cellulase and 10 to 4500 cellobiase; and an acid so as to adjust the pH of the ground product to within about 3 to 5.5;
(c) leaving the enzyme mixture to accomplish a prehydrolysis of the ground product for approximately 1 to 6 hours;
(d) after stage (c), additionally grinding the ground product;
(e) further hydrolyzing the ground product resulting from step (d) by the enzyme mixture for approximately 20 to 120 hours; and
(f) recovering the resulting liquid hydrolysed product.

4,886,673

METHOD OF PRESERVING MEAT PRODUCTS AND MICROORGANISMS FOR THE STABILIZATION OF MEAT PRODUCTS

Walter P. Hammes, Filderstadt-Bernhausen, Fed. Rep. of Germany, assignor to Karl Muller u. Co. KG, Stuttgart, Fed. Rep. of Germany

Filed Nov. 25, 1988, Ser. No. 275,920
Claims priority, application Fed. Rep. of Germany, Nov. 25, 1987, 3739989
Int. Cl.[4] A23L *1/31;* C12R *1/225, 1/265, 1/645*
U.S. Cl. 426—56 8 Claims

2. A method of preserving meat products comprising adding to the meat products a microorganism selected from the group consisting of:
Lactobacillus curvatus DSM 4265,
Micrococcus varians DSM 4263, and
Debaryomyces hanseneii DSM 4260 said microorganism being added in an amount effective to stabilize said meat products.

4,886,674

BEVERAGE MAKING CARTRIDGE

Barry Seward, and Kevin C. Pope, both of Hampshire, England, assignors to Mars G.B. Limited, London, England

Continuation of Ser. No. 787,808, Oct. 16, 1985, abandoned.
This application May 10, 1988, Ser. No. 195,387
Claims priority, application United Kingdom, Oct. 23, 1984, 8426741; Jul. 2, 1985, 8516666
Int. Cl.[4] B65D *30/04, 30/22, 30/24*
U.S. Cl. 426—79 7 Claims

1. A generally planar sealed beverage sachet comprising,
a product which provides a beverage when mixed in an aqueous medium,
a substantially air- and water-impermeable sheet material defining opposing panels sealed to each other by a seam along an upper portion of said sachet, a pair of side seams and a base seam to enclose said product which is contained therein,
a web of material adhered to both of said opposing panels of said sheet material between said side seams and between said base seam and the upper portion of said sachet,
said base seam being a self-opening, pressure sensitive seal which is automatically releasable thus allowing the base seam to open upon a liquid medium being introduced into the sachet under pressure through said upper portion above said web,
said web material being water permeable and having a seam whose apex points toward said upper portion of said sachet with said product being disposed on the upper portion of said web material, and
said web material when viewed in cross-section having an inverted, upwardly directed generally V-shaped portion of web material free from adherence to said opposing faces of said sheet material and configured to provide an assist to the opening of said base seal by everting downwardly towards said base seam upon introduction of said pressurized liquid medium through said upper portion above said web.

4,886,675

FAST-COOKED GRANULAR RICE PRODUCT AND METHOD OF PRODUCTION THEREOF

Heinz D. Jodlbauer, Berlin, Fed. Rep. of Germany, assignor to Die intech Dr. Jodlbauer Gesellschaft fur Innovation und Technoogie mbH, Fed. Rep. of Germany

Filed Sep. 21, 1987, Ser. No. 99,094
Claims priority, application Fed. Rep. of Germany, May 16, 1987, 3716467
Int. Cl.[4] A23L *1/168;* A23P *1/12*
U.S. Cl. 426—242 12 Claims

1. A granular rice product comprising rice components obtained as byproducts in producing table rice from raw rice, the rice components comprising husking flour, scouring flour, polishing flour and broken rice, including 20 to 40% by weight of water, related to the weight of the anhydrous components, partly agglutinated and granulated.

4,886,676

UTILIZATION OF FISH WASTE

Yngve Akesson, Hälsingborg, Sweden, assignor to Nestec S.A., Vevey, Switzerland

Filed May 3, 1984, Ser. No. 606,598
Claims priority, application European Pat. Off., Mar. 2, 1984, 84102259.3
Int. Cl.[4] A22C *25/00;* A23L *1/325*
U.S. Cl. 426—289 5 Claims

1. A method of producing a frozen fish product comprising the steps of sawing pieces of frozen fish to produce smaller pieces of frozen fish and sawdust, collecting sawdust from said sawing step, pumping the collected sawdust by means of a pump which develops a pressure of at least 30 bars to a sprayer, and spraying the collected sawdust onto the surface of said smaller pieces of frozen fish.

4,886,677

SURFACE-MODIFIED MESO-ERYTHRITOL COMPOSITION

Tsutomu Kondou, Sagamihara, Japan, assignor to Mitsubishi Kasei Corporation and Nikkon Chemicals Company, Limited, both of, Japan

Filed Aug. 23, 1988, Ser. No. 235,919
Claims priority, application Japan, Aug. 25, 1987, 62-209364; Oct. 6, 1987, 62-250756; Oct. 13, 1987, 62-256262; Oct. 20, 1987, 62-262709; Dec. 5, 1987, 62-306858
Int. Cl.[4] A23L *1/236*
U.S. Cl. 426—548 4 Claims

1. A surface-modified meso-erythritol composition obtained by mixing meso-erythritol crystal grains and meso-erythritol powders in a weight ratio of from 97/3 to 80/20, adding water to the resulting mixture to adjust to a water content of from 2 to 6% by weight, kneading the mixture, compression-molding the mixture, drying the resulting molded product.

4,886,678

METHOD FOR MANUFACTURE OF JELLY GUM CONFECTIONS

Chung-Wai Chiu, Westfield, and James P. Zallie, Bound Brook, both of N.J., assignors to National Starch and Chemical Corporation, Bridgewater, N.J.

Filed Nov. 4, 1988, Ser. No. 267,041

Int. Cl.[4] A23G 3/00

U.S. Cl. 426—578 11 Claims

1. A method for manufacturing jelly gum confections, comprising the steps of:

(a) providing a starch which has been debranched by treatment with a debranching enzyme, which debranched starch comprises partially or fully debranched amylopectin and at least 5%, by weight, short chain amylose, said starch being capable of setting to a gel suitable for use in jelly gum confections;

(b) blending a confectionery formulation, comprising a sweetener, the starch and water;

(c) heating the blended formulation to a sufficient degree to gelatinize the starch and fully disperse the solids; and

(d) forming jelly gum confections from the heated formulation;

wherein confection gel characteristics similar to those provided by high amylose starch are achieved at lower hot viscosities and at lower cooking temperatures than those required for high amylose starch.

4,886,679

FOOD COMPOSITION

Robert G. Hamilton, 14 Bonniebrae St., Wynnum West, Queensland 4178, and Frank J. Van Doore, 148 Windsor Road, Kelvin Grove, QLD 4059, both of Australia

Division of Ser. No. 905,649, Sep. 11, 1986. This application Mar. 23, 1989, Ser. No. 327,536

Claims priority, application Australia, Apr. 22, 1986, PH5570

Int. Cl.[4] A23K 1/00

U.S. Cl. 426—635 12 Claims

1. An intermediate moisture stable pet food composition for use as a component in the preparation of a pet food consisting essentially of:

(a) a source of protein in an amount effective to provide a minimum protein content of 15% by weight which comprises hash and optionally contains bone-in fractions,

(b) a moisture content in the range of approximately 25 to 35% by weight based on the total weight of the food composition and

(c) at least one humectant in an amount of approximately 5 to 15% based on the total weight of the food composition and which is effective to provide a maximum water activity of 0.9 which pet food has a pH of approximately 4 to 6 and can be stored indefinitely without substantial deterioration.

4,886,680

COATING OF WEB MATERIALS

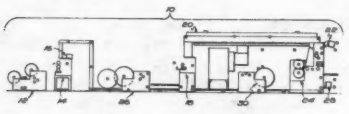
John D. Tindall, West Yorkshire, England, assignor to John Waddington PLC, Leeds, England

Continuation of Ser. No. 8,990, Jan. 30, 1987, abandoned. This application Sep. 2, 1988, Ser. No. 240,079

Claims priority, application United Kingdom, Feb. 1, 1986, 8602510

Int. Cl.[4] B05D 3/12

U.S. Cl. 427—8 3 Claims



1. A method for the continuous coating of base material webs, such as paper or other fibrous webs whose tensile strength is reduced when wet, with adhesive in liquid form comprising the steps of:

(i) unwinding a roll of base material web;

(ii) guiding the web through a coating machine;

(iii) applying, by means of adhesive application means of said coating machine, adhesive in liquid form as a film to one side of the base material web as it moves through the coating machine;

(iv) passing the coated web with the adhesive exposed through a drying machine;

(v) sensing the speed of at least one roller over which the web travels;

(vi) automatically controlling the tension in the web as it passes through the coating machine in response to said sensing to prevent the tension from exceeding a preset maximum to ensure that any weakening in the tensile strength of the web as a result of the application thereto of the liquid adhesive will not lead to breakage of the web; and

(vii) rewinding the coated web into roll form.

4,886,681

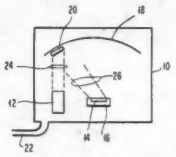
METAL-POLYMER ADHESION BY LOW ENERGY BOMBARDMENT

Joachim G. Clabes, Yorktown Heights, N.Y.; Peter O. Hahn, Burghausen, Fed. Rep. of Germany; Paul S. Ho, Chappaqua, N.Y.; Haralambos Lefakis, San Jose, Calif., and Gary W. Rubloff, Katonah, N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Continuation of Ser. No. 6,263, Jan. 20, 1987, abandoned, which is a continuation of Ser. No. 746,908, Jun. 20, 1985, abandoned. This application Dec. 6, 1988, Ser. No. 281,960

Int. Cl.[4] B05D 3/06

U.S. Cl. 427—38 15 Claims



1. A method for improving metal adhesion to an organic substrate, including the steps of:

irradiating a surface of said substrate with low energy particles, said particles being selected from the group consisting of reactive ions, electrons and photons, wherein said reactive ions and electrons have energies in the range of about 50–2000 eV and said photons have energies in the range of about 0.2–500 eV, said particles being incident on said surface with a particle flux of about 10^{15}–10^{17} particles/cm^2–sec.;

depositing a metal film onto said substrate simultaneously with said irradiation by low energy particles, said metal film being deposited from the vapor phase at an initial rate of deposition of approximately 1–100 angstroms per second, and

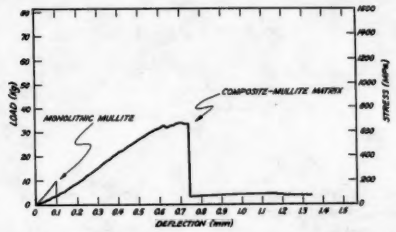
continuing said metal deposition until the desired thickness of metal is obtained on said substrate.

4,886,682

PROCESS FOR PRODUCING A FILAMENT-CONTAINING COMPOSITE IN A CERAMIC MATRIX

Raj N. Singh, Schenectady, and Achuta R. Gaddipati, Scotia, both of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Dec. 14, 1987, Ser. No. 132,753
Int. Cl.[4] B05D *3/06*
U.S. Cl. 427—56.1 8 Claims



1. A process for producing a composite containing a layer of filaments embedded in a ceramic matrix which comprises the following steps:

(a) providing matrix-forming ceramic material;

(b) admixing said matrix-forming material with an organic binding material;

(c) forming the resulting mixture into a tape;

(d) providing a filament having a diameter of at least about 50 microns and a length at least about 10 times its diameter;

(e) forming a plurality of said filaments into a layer wherein said filaments are spaced from each other and at least substantially parallel to each other;

(f) disposing said layer of filaments intermediate the faces of two of said tapes forming a layered structure;

(g) laminating the layered structure to form a laminated structure;

(h) heating said laminate structure to remove said organic binding material leaving no significant deleterious residue; and

(i) hot pressing the resulting porous structure at a sufficient temperature under a sufficient pressure for a sufficient period of time to consolidate said structure to produce said composite having a porosity of less than about 5% by volume, said composite containing no significant reaction product of said filaments and said matrix, said matrix having a thermal expansion coefficient which ranges from lower than that of said filaments to less than about 15% higher than that of said filaments, at least about 10% by volume of said composite being comprised of spaced filaments.

4,886,683

LOW TEMPERATURE METALORGANIC CHEMICAL VAPOR DEPOSTION GROWTH OF GROUP II-VI SEMICONDUCTOR MATERIALS

William E. Hoke, Wayland; Lindley T. Specht, Waltham, and Ralph Korenstein, Framingham, all of Mass., assignors to Raytheon Company, Lexington, Mass.

Filed Jun. 20, 1986, Ser. No. 876,608
Int. Cl.[4] C22C *16/00*
U.S. Cl. 427—252 44 Claims

1. A method for providing a layer comprising a group II-VI material over a substrate comprising the steps of:

directing a flow comprising a least one Group II vapor species towards the substrate;

directing a flow of a Group VI organic vapor towards the substrate, said organic having at least one organic group having an activation energy for formation of a free radical during decomposition of the organic group from the Group VI element which is lower than the activation energy of tertiary alkyls of the group VI element and thermally decomposing.

4,886,684

PROCESS FOR CONTINUOUS PRODUCTION OF PREPREGS HAVING A HIGH FIBER WEIGHT

Peter Schnell, Grieskirchen; Franz Maier-Lehner, Obertrattnach, and Rüdiger Spaun, Linz, all of Austria, assignors to Danutec Werkstoff Gesellschaft m.b.H., Linz, Austria

Filed Jul. 28, 1988, Ser. No. 227,538
Claims priority, application Fed. Rep. of Germany, Aug. 14, 1987, 3727185
Int. Cl.[4] D02G *3/00*
U.S. Cl. 427—370 6 Claims

1. A process for the continuous production of prepregs having a high fiber weight of 500 to 2500 g/m^2, which comprises:

(a) impregnating strands comprising inorganic and organic materials with a solvent-free epoxy resin system,

(b) feeding said impregnated fiber strands to a twin-belt press having a first part which is a pressure heating zone and a second part which is an integral pressure cooling zone,

(c) converting the impregnated fiber material into the B-state under the action of pressure and heat in said first part, and

(d) cooling the fiber material under pressure in said second part, thus stabilizing the B-state, and

wherein the pressure in the pressure heating zone in step (c) is increased from 0 bar of 0.5 to 3 bar from the beginning to the end thereof and is increased from the final pressure in the pressure heating zone up to 1 to 3 bar in the pressure cooling zone from the beginning to the end thereof, the pressure at the end of the pressure cooling zone being up to 0.5 bar above the pressure at the end of the pressure heating zone, and wherein the temperature in the pressure heating zone is 90° to 160° C. and the temperature at the end of the pressure cooling zone is 50° to 80° C., this temperature being at least 50° C. below the temperature in the pressure heating zone.

4,886,685

LAYER ELEMENTS AND THEIR PRODUCTION

Gerhard Wegner, Mainz-Drais, and Ernst Orthmann, Mainz-Bretzenheim, both of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Division of Ser. No. 47,160, May 8, 1987, Pat. No. 4,828,917.
This application Nov. 23, 1988, Ser. No. 275,751
Claims priority, application Fed. Rep. of Germany, May 10, 1986, 3615832
Int. Cl.[4] B05D *1/18*
U.S. Cl. 427—430.1 6 Claims

1. A process for the production of a layer element having a substrate with a hydrophobic surface and, applied on said substrate, one or more solid, thin, ordered mono-molecular layers having a defined, uniform and regular structure with uniform orientation of the molecules in one direction, which process comprises:

spreading a metallomacrocyclic polymer dissolved in an organic, water-immiscible solvent on a water surface, said polymer being of the formula $[M(Pcyc)O]_n$ where M is Si, Ge or Sn, Pcyc is a complex-forming centrosymmetric polycyclic ring system and n is the mean degree of polymerizaton and is equal to or greater than 3,

removing the solvent to form a mono-molecular solid-like uniformly oriented film of the said metallomacrocyclic polymer on the surface of the water,

immersing the substrate in the water; and

withdrawing the substrate from the water, whereby said mono-molecular film of the metallomacrocyclic polymer is transferred from the water surface to the substrate.

4,886,686

CIRCUIT BOARD SUBSTRATES OF IMPROVED THERMAL CONDUCTIVITY

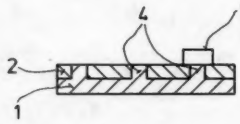
Helmut Muenstedt, Wachenheim, Fed. Rep. of Germany, assignor to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Filed Nov. 4, 1988, Ser. No. 267,275

Claims priority, application Fed. Rep. of Germany, Nov. 27, 1987, 3737889

Int. Cl.[4] B32B 9/00

U.S. Cl. 428—1 2 Claims



1. A circuit board substrate of good thermoconductivity, comprising a composite formed from

(A) an electrically and thermally insulating plastic and

(B) a plastic filled with a thermally highly conductive metallic filler, wherein the plastic is an epoxy resin or a highly heat-resistant thermoplastic from the group of the polyaryl ether sulfones, polyaryl ether ketones, polyether imides or thermotropic liquid-crystalline polymers.

4,886,687

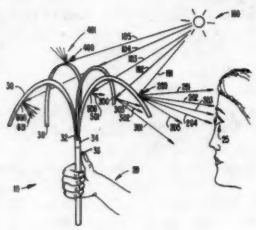
PASSIVE, REUSABLE DEVICE FOR AMUSEMENT OR FOR WARNING

Michael W. Malott, Antioch, Calif., assignor to 3-D Dan, Inc., Walnut Creek, Calif.

Filed Nov. 22, 1988, Ser. No. 274,576

Int. Cl.[4] D04D 7/08

U.S. Cl. 428—4 14 Claims



1. A reusable, passive amusement or warning device, comprising:

a plurality of flexible light diffracting strips, said strips being a flexible material including a foil having embossed thereon a diffractive pattern having about 5,000 to about 100,000 lines/inch;

means for holding the device in a user's hand during use; and

means for attaching the plurality of strips to the means for holding.

4,886,688

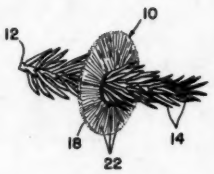
TREE ORNAMENT

Alice E. Szabo, 1146 Indian Summer Ave., LaPuente, Calif. 91744

Filed Nov. 2, 1987, Ser. No. 115,816

Int. Cl.[4] A41G 1/04; A47G 33/08

U.S. Cl. 428—7 7 Claims



1. A decorative ornament for mounting on a tree branch, the ornament comprising:

a central annular member adapted and sized for disposition in relatively closely-spaced relation about the tree branch,

the annular member having a radially outward surface and a radially inward surface, and

decorative means extending from the outward surface, said decorative means comprising decorative strips and a cord connecting said decorative strips together to form a decorative rope, the decorative strips extending radially outwardly from the outward surface of the annular member.

4,886,689

MATRIX-MATRIX POLYBLEND ADHESIVES AND METHOD OF BONDING INCOMPATIBLE POLYMERS

Abraham M. Kotliar, Westfield; William Sacks, Gillette; John P. Sibilia, Livingston, and Rakesh Kumar, Parsippany, all of N.J., assignors to Ausimont, U.S.A., Inc., Morristown, N.J.

Continuation of Ser. No. 901,661, Aug. 29, 1986, abandoned.

This application May 19, 1988, Ser. No. 196,819

Int. Cl.[4] B27N 5/02; B29C 47/06

U.S. Cl. 428—35.7 30 Claims

1. A method for forming a coextruded laminated composite of polymers, which comprises the steps of:

coextruding each of said polymers and an adhesive comprising a matrix-matrix polyblend of said polymers,

each of said polymers being arranged as layers in apposition to one another, with said adhesive comprising a matrix-matrix polyblend of said polymers interposed between said layers, said polymers in the adhesive being present as interfacially interlocked polymer volume fractions; and

applying heat and pressure, so as to form a coextruded laminated composite comprising polymer layers with the matrix-matrix polyblend adhesive interposed between and bonded to the polymer layers.

4,886,690

PEELABLE BARRIER FILM FOR VACUUM SKIN PACKAGES AND THE LIKE

Kent A. Davis, Travelers Rest; Solomon Bekele, Taylors, and Henry W. Stockley, Spartanburg, all of S.C., assignors to W. R. Grace & Co., Duncan, S.C.

Filed Dec. 21, 1987, Ser. No. 136,680

Int. Cl.[4] B32B 1/08

U.S. Cl. 428—36.6 12 Claims

1. A forming web for vacuum skin packaging and the like which web is separable into permeable and impermeable films comprising:

(A) a coextruded, multi-layer composite film web comprising a gas permeable film and a gas impermeable film which can be manually delaminated from each other;

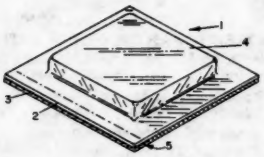
(1) said gas permeable film having a plurality of layers including:

(a) a heat sealable layer selected from the group consisting of ethylene polymers, copolymers, and blends thereof; and,

(b) a layer comprising a linear ethylene/alpha-olefin copolymer having a density of less than 0.915 gms/cm^3 and,

(2) said multi-layer gas impermeable film comprising a plurality of layers including:

(a) a barrier layer comprising a material selected from the group consisting of hydrolyzed ethylene vinyl



acetate copolymers (EVOH) and vinylidene chloride copolymers or terpolymers (PVDC), said barrier layer being immediately adjacent to and in contact with said linear ethylene/alpha-olefin copolymer (1)

(b) so that when delamination occurs the barrier layer will become a first surface layer; and,

(b) an outer or second surface layer of polymeric material; and,

(B) said heat sealable layer being capable to sealing to a polymeric surface with a bond strength greater than the force required to rupture and subsequently delaminate said permeable layer from said impermeable layer.

4,886,691

CUT RESISTANT JACKET FOR ROPES, WEBBING, STRAPS, INFLATABLES AND THE LIKE

Robert C. Winckhofer, Richmond, Va., assignor to Allied-Signal Inc., Morris Township, Morris County, N.J.

Continuation-in-part of Ser. No. 140,530, Jan. 4, 1988, abandoned, which is a continuation-in-part of Ser. No. 873,669, Jun. 12, 1986, abandoned. This application Nov. 29, 1988, Ser. No. 277,486

Int. Cl.[4] B32B *1/04*

U.S. Cl. 428—68 **13 Claims**

1. A cut resistant article comprising

(a) a less cut resistant member surrounded by

(b) a more cut resistant jacket, said more cut resistant jacket comprising a fabric of yarn,

said yarn in said fabric consisting essentially of

(c) at least one high strength longitudinal strand having a tensile strength of at least 1 GPa, and

(d) a fiber wrapped around said strand.

4,886,692

DUST CONTROL MAT WITH NON-CLEATED BORDERS

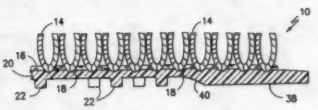
Robert C. Kerr, and John H. Murray, both of LaGrange, Ga., assignors to Milliken Research Corporation, Spartanburg, S.C.

Division of Ser. No. 216,970, Jul. 11, 1988. This application Sep. 14, 1988, Ser. No. 244,183

Int. Cl.[4] B32B *3/02*

U.S. Cl. 428—82 **2 Claims**

1. A pad for use in forming cleats in a rubber backed dust control mat comprising: A length of material selected from silicone or butyl rubber having two longitudinal edges, said longitudinal edges being cut at an angle of between 10°–25°



with a horizontal surface and a plurality of perforations formed therein.

4,886,693

FLOCKED YARN AND METHOD FOR MANUFACTURING

Tomoji Haranoya, and Shigeki Iwamoto, both of Ashikaga, Japan, assignors to Toyo Denshoku Kabushiki Kaisha, Tochigi, Japan

Filed Apr. 27, 1989, Ser. No. 343,795

Claims priority, application Japan, Apr. 28, 1988, 63-104028

Int. Cl.[4] B32B *33/00*

U.S. Cl. 428—90 **19 Claims**

1. A flocked yarn comprising:

a core yarn the total denier of which is in the range of 140–1260 (154–1386 d tex);

a layer of adhesive applied onto the periphery of said core yarn; and

flock fibers with a length of 0.5–3.0 mm which are flocked onto the layer of adhesive at a flocking density of at least 30,000/cm^2,

the weight in grams A of adhesive per 9,000 m of core yarn satisfying the equation (I)

$$27.5\sqrt{D} \leqq A \leqq 72.5\sqrt{D} \quad \text{(I)}$$

wherein D is the total denier of the corn yarn.

4,886,694

EDGE CONTOUR FOR LOAD-CARRYING DECK

Rene Donnard, Geispolsheim, France, assignor to Lohr Industrie, S.A., Hangenbieten, France

Filed Jun. 3, 1988, Ser. No. 201,792

Claims priority, application France, Jun. 3, 1987, 87 07857

Int. Cl.[4] B32B *3/10*

U.S. Cl. 428—137 **10 Claims**

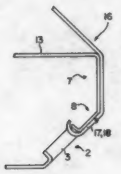
1. An edge section for a load-carrying plate for hooking the ends of lashing straps, comprising:

a continuous section (1) mounted upon each side of said load-carrying plate,

said section having an oblique hooking face (2) provided with a lateral row of holes (3),

said hooking face (2) being extended upwardly by a longitu-

dinal supporting face extending along the side of the edge section; and



said oblique hooking face being recessed relative to said supporting face.

4,886,695

CERAMIC-METAL COMPOSITE BODIES

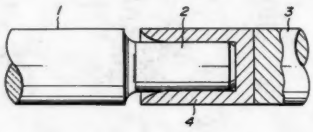
Takeyuki Mizuno, Toyohashi, and Koji Kato, Nagoya, both of Japan, assignors to NGK Insulators, Ltd., Nagoya, Japan

Filed Apr. 28, 1988, Ser. No. 187,543

Claims priority, application Japan, May 11, 1987, 62-68813[U]

Int. Cl.[4] B32B *3/10*

U.S. Cl. 428—137 3 Claims



1. A ceramic-metal composite body produced by fitting a protruding portion of a ceramic member into a concave portion or a through-hole of a metallic member, wherein an outer surface of the protruding portion of the ceramic member has a quantity of undulation, measured in a plane including the axial line of the protruding portion, of not more than 5 μm.

4,886,696

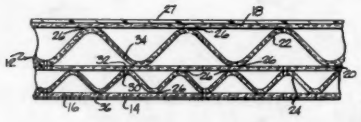
CORRUGATED PAPERBOARD AUTOMOTIVE LINER

David W. Bainbridge, Lakewood, Colo., assignor to Manville Corporation, Denver, Colo.

Filed May 10, 1988, Ser. No. 192,096

Int. Cl.[4] B32B *3/28;* E04B *1/82*

U.S. Cl. 428—184 6 Claims



1. A self-supporting headliner panel for lining the interior face of an automotive roof, comprising:

front, back and median paperboard sheets spaced from each other in substantially parallel relationship, the distance between the front sheet and the median sheet being less than the distance between the median sheet and the back sheet;

corrugated paperboard mediums located between the median sheet and the front and back sheets and being adhered thereto;

a vapor barrier on the outer face of the back paperboard sheet to prevent condensation from the metal roof of a vehicle in which the headliner panel is installed from penetrating the panel;

the front and median sheets and the corrugated mediums containing a plurality of relatively small diameter perforations for improving the sound absorption of the panel; and

a layer of decorative material on the outer face of the front paperboard sheet, said layer permitting passage therethrough of ambient air, thus permitting sound waves to reach and pass through the perforations in the front paperboard sheet;

the panel containing heat-molded nonplanar portions.

4,886,697

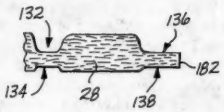
THERMOPLASTIC MATERIAL CONTAINING ABSORBENT PAD OR OTHER ARTICLE

Lee E. Perdelwitz, Jr, Tacoma; Robert H. Young, Maple Valley; Ron H. Iff, Puyallup, all of Wash.; David E. Hanke, San Diego, Calif.; Kathleen S. Allison, Tacoma, Wash.; Raimo K. Rahkonen, Gig Harbor, Wash., and Amar N. Neogi, Seattle, Wash., assignors to Weyerhaeuser Company, Tacoma, Wash.

Filed Apr. 29, 1988, Ser. No. 188,474

Int. Cl.[4] B32B *23/02*

U.S. Cl. 428—192 80 Claims



1. An absorbent article comprised of a thermobonded mixture of fibrous material which includes thermoplastic fibers, the article having a field and a densified peripheral edge margin of fiberous material along at least a section of the article, the densified peripheral edge margin of fiberous material forming a substantial liquid barrier along the at least a section of the article.

4,886,698

MULTIPLE-LAYER POLYOLEFIN FILMS

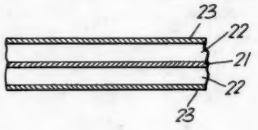
John R. Purdy, Stockton-On-Tees, England, assignor to Imperial Chemical Industries PLC, London, United Kingdom

Continuation of Ser. No. 863,618, May 15, 1986, abandoned. This application May 8, 1989, Ser. No. 349,933

Claims priority, application United Kingdom, May 24, 1985, 8513247

Int. Cl.[4] B32B *27/32*

U.S. Cl. 428—213 11 Claims



1. A multiple-layer polyolefin film comprising a primary layer of an adhesive resin and, on each surface thereof, a secondary layer of an olefin polymer wherein

(a) the adhesive resin comprises an ethylene copolymer having a softening temperature below that of the secondary olefin polymer,

(b) the secondary layer comprises a biaxially oriented layer of a propylene polymer, and

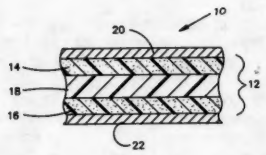
(c) the thickness of the primary layer is less than 10% of the total film thickness.

4,886,699

GLASS FIBER REINFORCED FLUOROPOLYMERIC CIRCUIT LAMINATE

James R. Carroll, Tempe; Leon W. McGinnis, Mesa; Terry L. Miller, Gilbert, and Michael B. Norris, Chandler, all of Ariz., assignors to Rogers Corporation, Rogers, Conn.

Filed Oct. 26, 1987, Ser. No. 113,533
Int. Cl.[4] B32B *17/02, 27/00*
U.S. Cl. 428—228 44 Claims



1. A circuit substrate laminate for microwave frequency applications consisting essentially of:

at least one first layer of a fluoropolymer impregnated woven glass cloth having opposed first and second surfaces;

at least one second layer of a random microglass reinforced fluoropolymer on said first surface of said first layer of fluoropolymer impregnated woven glass cloth; and

at least one third layer of a random microglass reinforced fluoropolymer on said second surface of said first layer of fluoropolymer impregnated woven glass cloth;

said second and third layers of random microglass reinforced fluoropolymer providing smooth outer surfaces to said circuit substrate laminate; and

wherein said fluoropolymer is at least one of the fluoropolymers selected from the group consisting of polytetrafluoroethylene and a copolymer of tetrafluoroethylene and perfluoroakyl vinyl ether.

4,886,700

LAMINATED COMPOSITE OF A RIGID POLYURETHANE MODIFIED POLYISOCYANURATE SUBSTRATE AND METAL, PLASTIC, CELLULOSE, GLASS, CERAMIC OR COMBINATIONS THEREOF

Usama E. Younes, Newtown Square, Pa., assignor to Arco Chemical Technology, Inc., Wilmington, Del.

Filed Aug. 24, 1987, Ser. No. 88,748
Int. Cl.[4] B32B *7/00*
U.S. Cl. 428—252 17 Claims

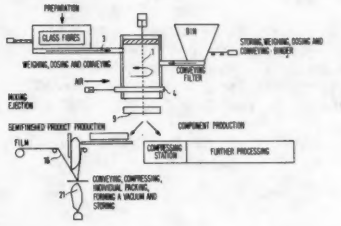
1. A laminated composite which comprises forming in combination in a compression mold at least one layer of a rigid polyurethane modified polyisocyanurate thermoset composition prepared by reacting in said mold at temperature of from about ambient to about 140° C. ,a reaction mixture of an organic di- or polyisocyanate, from about 2 to about 50 parts by weight of a cyclic alkylene carbonate and from about 2 to about 50 parts by weight of a polyether polyol, based on 100 parts of the isocyanate-carbonate-polyol mixture, and in the presence of soluble adduct of a tertiary amine and a cyclic alkylene carbonate as catalyst at a concentration of from about 0.005 to about 5.0 weight percent based on the total composition and at least one layer of material selected from the group consisting of metal, cellulose, plastic, glass and ceramic or combination thereof.

4,886,701

PROCESS FOR PRODUCING A TANGLED FIBRE MATERIAL FROM GLASS FIBRES AND POLYMER FOR THE PRODUCTION OF GLASS FIBRE-REINFORCED PLASTIC MOULDINGS AND APPARATUS FOR PERFORMING THE PROCESS

Gerd Ehnert, Graben-Neudorf; Manfred Ehlers, Kraichtal-Unteröswisheim; Gerhard Sauer, Bruchsal, and Klaus Vogel, Kraichtal-Menzingen, all of Fed. Rep. of Germany, assignors to Menzolit GmbH, Kraichtal-Menzingen, Fed. Rep. of Germany

Filed Aug. 24, 1987, Ser. No. 88,423
Claims priority, application Fed. Rep. of Germany, Sep. 1, 1986, 3629748; Feb. 10, 1987, 3704035
Int. Cl.[4] B32B *17/04;* B29C *67/14*
U.S. Cl. 428—282 46 Claims



1. Product for producing fiber-reinforced thermal plastic parts, the product comprising a wadding-like felt including individual fibers substantially completely individualized, the individual fibers assuming an irregular arrangement and distribution, a binder with a primary base adhering to laminated individual fibers, and vacuum packaging means for accommodating the laminated individual fibers.

4,886,702

PROCESS FOR THE PREPARATION OF A COAGULATED MATERIAL

Dirk P. Spek, G. Sterkenburgstraat 24, 4268 GS Meeuwen, and Leonardus A. van der Heyden, Van Ruysdaelstraat 15, 5161 VJ Sprang-Capelle, both of Netherlands

Filed Jan. 21, 1988, Ser. No. 147,060
Claims priority, application Netherlands, Jun. 4, 1984, 8401784
Int. Cl.[4] B32B *5/14;* B05D *5/00;* C08J *9/28*
U.S. Cl. 428—308.4 26 Claims

1. A composition comprising

(a) a coagulable polymer latex,

(b) a foaming agent comprising a low boiling water insoluble halogenated hydrocarbon, and

(c) a textile cloth impregnated with the combination of (a) and (b).

4,886,703

MAGNETIC RECORDING MEDIUM

Kazuo Hasumi; Hideomi Watanabe; Tsutomu Okita; Katsumi Ryoke, and Hideaki Kosha, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Apr. 19, 1988, Ser. No. 183,105
Claims priority, application Japan, Apr. 20, 1987, 62-95431
The portion of the term of this patent subsequent to Nov. 14, 2006, has been disclaimed.
Int. Cl.[4] G11B *5/70*
U.S. Cl. 428—323 16 Claims

1. A magnetic recording medium comprising a support having provided on one surface thereof a magnetic layer comprising a binder and ferromagnetic particles dispersed therein, and on the opposite surface thereof a backing layer comprising

a binder and non-magnetic particles dispersed therein, wherein at least one of said binders comprises a vinyl chloride copolymer resin having a vinyl chloride unit content of about 70 wt. % or more based on the total amount of said binder, a nitrogen content of about from 0.01 to 1 wt. % based on the total amount of said binder, and a polymerization degree of about from 250 to 700; and said non-magnetic particles comprises fine carbon particles having a DBP oil absorption of about 150 ml/100 g or more, a particle diameter of from 1 to 500 mμ, and being selected from the group consisting of graphite, carbon black, and carbon black graphite polymer, wherein said vinyl chloride copolymer resin contains a heterocyclic group containing a nitrogen atom directly connected to the vinyl group of the vinyl chloride copolymer resin.

4,886,704

STRIPPABLE COATING FILM AND COATING METHOD USING SAME

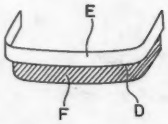
Keiichi Kamada; Motoyuki Torikai, both of Yokohama, and Yasuo Ohkita, Naka, all of Japan, assignors to Mitsui Toatsu Chemicals, Incorporated, Tokyo, Japan

PCT No. PCT/JP85/00594, § 371 Date Jun. 26, 1987, § 102(e) Date Jun. 26, 1987, PCT Pub. No. WO87/02689, PCT Pub. Date May 7, 1987

PCT Filed Oct. 26, 1985, Ser. No. 69,554

Int. Cl.[4] B05D *3/06*; B32B *5/16*

U.S. Cl. 428—323 **7 Claims**



3. A strippable coating film comprising two layers of resin coating materials, wherein the undercoating layer in contact with the object to be coated contains therein 1 to 20 parts by weight (based on the resin component) of carbon black and has adhesive power, wherein the resin component of the undercoating layer is an acrylic and its adhesion to the substrate is 20 to 1000 g/inch as expressed in terms of 180° peeling strength, wherein the overcoating layer located on the surface side contains therein 1 to 20 parts by weight (based on the resin component) of carbon black wherein said layer is flexible and does not exhibit surface tack and and wherein the resin component of the overcoating layer comprises 25 to 40 parts by weight of acrylonitrile, 64 to 40 parts by weight of butyl acrylate, and 0.5 to 10 parts by weight of (meth)acrylic acid.

6. A coating method for creating attractively finished boundaries which comprises applying a coating material containing 1 to 20% by weight (based on the resin component) of carbon black in the dry film and having adhesive power to an object to be coated wherein the adhesion of the object to be coated is 20–1000 g/inch as expressed in terms of 180° peeling strength, and thereby forming an undercoating layer, the resin component of which is an acrylic resin, in contact with the object to be coated; applying a coating material containing 1 to 20% by weight (based on the resin component) of carbon black in the dry film, having flexibility and exhibiting film-forming properties to the undercoating layer and thereby forming a surface layer, the resin component of which comprises 25 to 40 parts by weight of acrylonitrile, 65 to 40 parts by weight of butyl acrylate, and 0.5 to 10 parts by weight of (meth)acrylic acid, to produce a strippable coating film composed of two layers both containing carbon black; cutting only the surface layer of the coating film with a laser beam from a YAG laser; stripping off the unnecessary portions of the laser-cut surface layer together with the underlying adhesive layer; applying a final coat of paint to the parts from which the coating film has been removed; and stripping off the remaining portions of the strippable coating film.

4,886,705

POLYPHENYLENE SULFIDE FILM

Seiji Sakamoto, Machida, Japan, assignor to Diafoil Company, Limited, Tokyo, Japan

Filed Jun. 21, 1988, Ser. No. 210,620

Claims priority, application Japan, Jul. 7, 1987, 62-169383

Int. Cl.[4] B32B *5/16*

U.S. Cl. 428—328 **17 Claims**

1. A uniaxially or biaxially oriented polyphenylene sulfide film selected from the group consisting of polyphenylene sulfide homopolymers, polyphenylene sulfide copolymers, blends of polyphenylene sulfide homopolymers and polyphenylene sulfide copolymers, blends of polymers having m-phenylene sulfide main repeating units and polyphenylene sulfide homopolymers or polyphenylene sulfide copolymers, said film containing two groups of particles, and said film having the number of n-order of interference fringes H_n (per mm^2) as measured by a multiple interference method which satisfies the following relations (1) and (2) at the same time:

$$30 \leqq H_1 \leqq 300 \quad (1)$$

$$10 \leqq H_3 \leqq 300 \quad (2).$$

4,886,706

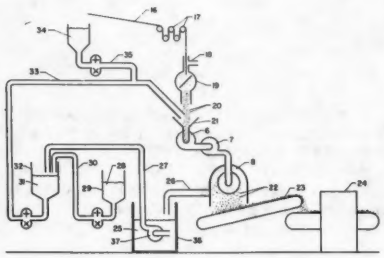
FIBROUS POLYACRYLONITRILE REINFORCING MIXTURE FOR FRICTION PRODUCT APPLICATIONS, AND METHOD OF MAKING SAME

Hughey A. Rush; Billy B. Hibbard, both of Williamsburg, Va.; Johnson L. Pursoo, Lake Jackson, Tex.; John W. Lindsay; Thomas E. Smith, both of Williamsburg, Va.; Kenneth Harper, Lanexa, Va.; MIchael V. Tullos, Grimstead, Va., and James E. Davis, Gloucester, Va., assignors to BASF Corporation, Williamsburg, Va.

Filed Mar. 11, 1987, Ser. No. 24,644

Int. Cl.[4] D04H *1/58*

U.S. Cl. 428—288 **11 Claims**



1. A fibrous reinforcing mixture suitable for use in friction products comprising:

polyacrylonitrile fibers having a denier per fiber in the range of from 0.5 to about 20 and an average length in the range of from about 1 to about 2 millimeters; at least 37% by weight based on the dry weight of said fibers of a liquid additive combined with said fibers wherein said additive is selected from the group consisting of:

(a) polyethylene glycol esters of pelargonic acid;

(b) polyethylene glycol esters of enanthic, caprylic or capric acids;

(c) blends of polyethylene glycol esters of enanthic, caprylic, pelargonic, or capric acids,

(d) blends of polyethylene glycol esters of carboxylic

acids derived from natural products containing at least 50% by weight of carboxylic acids containing less than 14 carbon atoms; and

(e) reaction products of ethylene oxide and carboxylic acid amides wherein at least 70% of the acids from which the amide is derived contain between 16 and 20 carbon atoms; and,

an effective amount of an antioxidant.

4,886,707

POLYAMIDE YARN WITH NONYELLOWING ANTIOXIDANT FINISH

Robert M. Marshall, Chesterfield, Va., assignor to Allied Signal Inc., Morris Township, Morris County, N.J.

Filed Jul. 5, 1988, Ser. No. 214,980
Int. Cl.[4] D02G 3/48
U.S. Cl. 428—395 14 Claims

1. An improved finish composition for polyamide yarn to be processed into tire cord, said improvement comprising a thiotriazine tert-butylphenol compound in an amount sufficient to provide enhanced aged adhesion retention of said tire cord to rubber.

4,886,708

PROCESS FOR THE MANUFACTURING OF SYNTHETIC COVERINGS HAVING IMPROVED RESISTANCE TO SOILING, AND SYNTHETIC COVERING OBTAINED THEREBY

Daniel Marchal, Burden, Luxembourg, assignor to Eurofloor S.A., Luxembourg

Filed Sep. 14, 1987, Ser. No. 96,376
Claims priority, application Luxembourg, Oct. 3, 1986, 86620
Int. Cl.[4] B05D 3/02; B32B 9/04
U.S. Cl. 428—447 17 Claims

13. Synthetic covering comprising:

a support layer; and

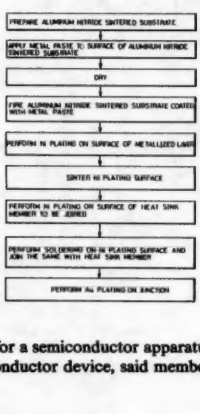
a plastisol based wear layer covering said support layer, said plastisol based wear layer including at least one cross-linked silicone polymer therein.

4,886,709

MEMBER FOR SEMICONDUCTOR APPARATUS

Akira Sasame; Hitoyuki Sakanoue; Hisao Takeuchi; Masaya Miyake; Akira Yamakawa, and Yasuhisa Yushio, all of Hyogo, Japan, assignors to Sumitomo Electric Industries, Ltd., Osaka, Japan

Filed Jul. 1, 1988, Ser. No. 214,508
Claims priority, application Japan, Jul. 3, 1987, 62-165191
Int. Cl.[4] B22F 3/00
U.S. Cl. 428—552 9 Claims


PREPARE ALUMINUM NITRIDE SINTERED SUBSTRATE
APPLY METAL PASTE TO SURFACE OF ALUMINUM NITRIDE SINTERED SUBSTRATE
DRY
FIRE ALUMINUM NITRIDE SINTERED SUBSTRATE COATED WITH METAL PASTE
PERFORM Ni PLATING ON SURFACE OF METALLIZED LAYER
SINTER Ni PLATING SURFACE
PERFORM Ni PLATING ON SURFACE OF HEAT SINK MEMBER TO BE JOINED
PERFORM SOLDERING ON Ni PLATING SURFACE AND JOIN THE SAME WITH HEAT SINK MEMBER
PERFORM Au PLATING ON EACH

1. A member for a semiconductor apparatus for carrying or holding a semiconductor device, said member comprising:

an insulating member of aluminum nitride having a major surface to face said semiconductor device;

a radiating member to be joined to said insulating member, being mainly formed of a material selected from a group of a copper-tungsten alloy and a copper-molybdenum alloy;

a stress relieving member interposed between said insulating member and said radiating member; and

a soldering member for joining said insulating member, said stress relieving member and said radiating member with each other,

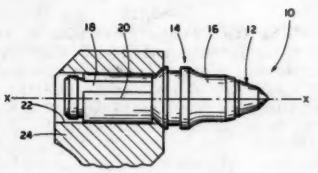
said stress relieving member being prepared by any soft metal and a soft alloy having a high plastic deformability in order to relax, by its own plastic deformation, thermal stress caused by difference in thermal expansion coefficient between said insulating member and said radiating member in a cooling step upon soldering.

4,886,710

MINING/CONSTRUCTION TOOL BIT HAVING BIT BODY FABRICATED FROM MN-B STEEL ALLOY COMPOSITION

Mark S. Greenfield, Cary, N.C., assignor to Kennametal Inc., Latrobe, Pa.

Filed Apr. 16, 1987, Ser. No. 39,208
Int. Cl.[4] G22F 7/04
U.S. Cl. 428—564 5 Claims



1. In a mining and construction bit for mounting in a socket of a block, a bit body elongated about a longitudinal axis and having a forward body portion and a rearward body portion; a solitary cemented tungsten carbide tip attached to said forward body portion; a retaining means for rotatably retaining said bit in the socket of a block, whereby said bit is rotatable about said longitudinal axis; said retaining means loosely mounted on said rearward shank portion; said tungsten carbide tip and said bit body rotationally symmetric about said longitudinal axis; said bit body being composed of a Mn-B steel alloy composition the alloy content of which in percents by weight comprising: carbon, 0.33–0.38; manganese, 1.10–1.35; boron, 0.0005 minimum; silicon 0.15–0.30; sulfur, 0.045 maximum; and phosphorus, 0.035 maximum, wherein said composition has a minimum hardenability of 47 Rockwell C at the Jominy 6/16 position and a maximum as-rolled hardness of 22 Rockwell C such that without anneal said composition meets hardenability and machinability requirements that make it useful for fabricating mining and construction bit bodies of all sizes.

4,886,711

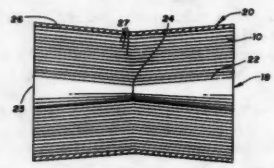
CATALYTIC CONVERTER METAL MONOLITHIC CATALYST SUBSTRATE

Leslie A. Foldvary, Bancroft, Mich., assignor to General Motors Corporation, Detroit, Mich.

Continuation-in-part of Ser. No. 125,929, Nov. 27, 1987, abandoned. This application Jun. 20, 1988, Ser. No. 209,117
Int. Cl.[4] B01J 35/04
U.S. Cl. 428—592 13 Claims

1. A catalytic converter metal monolith catalyst substrate, having first and second axial end portions and an axial central portion, said substrate comprising a center pin having a surface

with an axial interference profile, a strip of metal foil wound about and conforming in parallel layers to the surface of said pin, and a tubular shell extending about said foil and conforming to the profile of said layers of foil, said axial end portions



having a circular cross section of a first diameter and said central portion having a circular cross section of a second diameter, whereby the pin and shell cooperate to mechanically lock the layers of metal foil together to prevent their relative movement.

4,886,712

STEEL STRIP FOR FOOD PACKAGING

Nazzareno Azzerri, Pomezia, and Leonardo Giorgi, Anzio, both of Italy, assignors to Nuova Italsider S.p.A., Genoa, Italy

Filed Jun. 26, 1987, Ser. No. 66,934

Claims priority, application Italy, Jul. 14, 1986, 48264 A/86

Int. Cl.[4] B32B *15/04*

U.S. Cl. 428—632 **7 Claims**

6. A steel strip weldable into cans, said cans having an inner and an outer surface and said strip having a metallic face adapted to form the inner surface of said cans, the improvement wherein said steel strip includes a layer of a semi-conducting oxide which includes both P-type charge-bearing atoms (NA) and N-type charge-bearing atoms (ND) and wherein the ratio of NA to ND is greater than 1.2:1, said semi-conducting oxide being selected from the group consisting of tin oxide and nickel oxide.

4,886,713

DEEP DRAWABLE ALUMINUM SHEET OR STRIP

Friedrich Ostermann, Meckenheim-Merl; Christian Dumont, Bornheim; Rainer Balbach, Massenbachhausen, and Gerhard Sollner, St. Augustin, all of Fed. Rep. of Germany, assignors to Vereingte Aluminum-Werke Aktiengesellschaft, Bonn, Fed. Rep. of Germany

Filed Apr. 25, 1988, Ser. No. 185,537

Claims priority, application Fed. Rep. of Germany, Apr. 25, 1987, 3713909

Int. Cl.[4] B32B *15/00*

U.S. Cl. 428—687 **12 Claims**

1. A deep drawable sheet, or a strip made of aluminum or an aluminum alloy comprising an outside surface pretreated for deep drawing, said outside surface having a microroughness, Ra ranging between about 0.1 and about 0.8 μm and having a uniform, honeycomb-shaped structure, wherein a honeycomb diameter ranges between about 20 μm and about 200 μm.

4,886,714

PLATELIKE MAGNETIC POWDER AND A RECORDING MEDIUM WHICH USES THE PLATELIKE MAGNETIC POWDER

Hideo Torii, Higashiosaka; Masaki Aoki, Minou; Hideaki Komoda; Nobuyuki Aoki, both of Hirakata; Ikuo Ota, Yawata, and Keiichi Ochiai, Hirakata, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed May 9, 1988, Ser. No. 192,051

Claims priority, application Japan, May 7, 1987, 62-111024

Int. Cl.[4] C04B *35/26*

U.S. Cl. 428—694 **5 Claims**

1. An iron oxide magnetic powder of platelike particles, having a composition expressed by the formula:

$$MFe^{II}_{m-x-2[x]}Fe^{III}_{12+2(m+n)-y}A^{II}_{x}B^{III}_{y}C^{IV}_{z}O_{p}$$

where: M is a metallic element comprising at least one of Ba, Sr, Pb and Ca; A is at least one metallic element selected from the group consisting of Co, Cu, Ni, Zn and Mn; B is at least one metallic element selected from the group consisting of Cr, Al and In; C is at least one metallic element selected from the group consisting of Ti, Zr, Ge and Sn; x is 0.70 to 1.86; y is 0 to 0.11; z is 0.70 to 1.80; p is a number of oxygens satisfying electric neutrality; and each of m and n is a positive number satisfying the relation: $21.30 \geqq 12+3m+2n-z \geqq 14.90$,

wherein each of the particles has a magnetoplumbite and spinel crystal structure, in which layers each comprising R blocks and layers each comprising S blocks are alternately arranged, where: each of the R blocks is defined as a crystal block which contains Fe^{3+} ions and has, in parallel with a c plane of the magnetoplumbite structure, three layers in which a layer containing one M^{2+} ion and three O^{2-} ions is arranged between two layers each containing nine O^{2-} ions; and each of the S blocks is defined as a crystal block which contains Fe^{3+} ions and has, in parallel with the c plane, two symmetrical layers each containing four O^{2+} ions, and

wherein, in each of the particles, part of the R blocks are lacking in M^{2+} ions such that said part is replaced by S blocks to reduce the number of the R blocks whereby the number of the S blocks is larger than that of the R blocks.

4,886,715

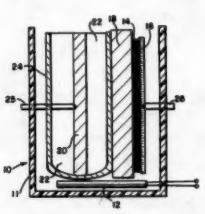
MOLTEN MEMBRANE ELECTROLYTE BATTERY

Francis P. McCullough, Jr.; Robert A. Cipriano, both of Lake Jackson, and R. Vernon Snelgrove, Damon, all of Tex., assignors to The Dow Chemical Company, Midland, Mich.

Continuation-in-part of Ser. No. 4,003, Jan. 16, 1987, abandoned, and a continuation-in-part of Ser. No. 3,974, Jan. 16, 1987, abandoned. This application Sep. 28, 1988, Ser. No. 250,789

Int. Cl.[4] H01M *6/20*

U.S. Cl. 429—103 **11 Claims**



1. A primary rechargeable electrical energy storage device comprising a housing having an electrically non-conductive interior surface, at least one cell positioned in said housing, each cell comprising an anode consisting of a low melting

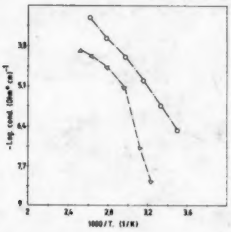
metal selected from the group consisting of alkaline earth metal, alkaline earth metal alloys, alkali metal, alkali metal alloy and alkali metal eutectic mixtures thereof, a separator surrounding said anode, said separator being capable of transporting or passing ionic species and electrically isolating said anode, a cathode comprising a carbonaceous fibrous structure, and a non-aqueous lithium laurate membrane electrolyte associated with said cathode.

4,886,716

SOLID POLYMERIC ELECTROLYTE AND ELECTROCHEMICAL GENERATORS CONTAINING IT

Arnaldo Roggero, San Donato Milanese; Bruno Scrosati, Rome; Maria Andrei, Berceto; Stefano Passerini, Rome, and Ugo Pedretti, Milan, all of Italy, assignors to Enitricerche S.p.A., Milan, Italy

Filed Oct. 6, 1988, Ser. No. 254,354
Claims priority, application Italy, Oct. 16, 1987, 22305 A/87
Int. Cl.[4] H01M *6/18*
U.S. Cl. 429—192 8 Claims



1. Solid polymeric electrolyte, constituted by a solid solution of an ionic compound dissolved in a polyether, characterized in that said polyether is a solid and cross-linked polyether obtained by means of the copolymerization of a vinyl-ether of formula:

$$R—(O—CH_2—CH_2)_n—O—CH=CH_2 \quad (I)$$

wherein:

R is the methyl or ethyl radical; and

n is an integer comprised within the range of from 1 to 16; with a di-vinyl-ether of formula:

$$CH_2=CH—(O—CH_2—CH_2)_m—O—CH=CH_2 \quad (II)$$

wherein:

m is an integer comprised within the range of from 1 to 16; with a molar ratio of the di-vinyl-ether (II) to the vinyl-ether (I) comprised within the range of from 1/100 to 10/100; with said polyether having a weight average molecular weight of about 10,000, and a glass transition temperature (T_g) comprised within the range of from −60° C. to −80° C.

4,886,717

PHOTOCHROMIC MATERIAL, PHOTOCHROMIC DEVICE AND METHOD FOR RECORDING AND ERASING INFORMATION

Masafumi Jinno, 405, Nakayama Kopo, 238, Kokubu, Ebina-shi, Kanagawa 243; Ichiro Kake, 5-409, Shimonoike Dai-2-Danchi, 545, Nagasone-cho, Sakai-shi, Osaka 591; Yuichiro Nishina, 3-8-9, Komegafukuro, Sendai-shi, Miyagi 980, and Tsuyoshi Masumoto, 3-8-22, Kamisugi, Sendai-shi, Miyagi 980, all of Japan

PCT No. PCT/JP86/00563, § 371 Date Sep. 8, 1987, § 102(e) Date Sep. 8, 1987, PCT Pub. No. WO87/03108, PCT Pub. Date May 21, 1987
PCT Filed Nov. 6, 1986, Ser. No. 69,440
Claims priority, application Japan, Nov. 6, 1985, 60-249808
Int. Cl.[4] G03C *1/72, 5/16*
U.S. Cl. 430—19 6 Claims

1. A photochromic device comprising:

(i) a first transparent electrode layer;

(ii) a transparent layer of polycrystalline n-type semiconductor on the transparent electrode layer;

(iii) a thin film of montmorillonite having a photochromatically effective amount of tris (2,2'-bipyridyl)rhodium (III) or of tris(1,10-phenanthroline)rhodium (III) ions intercalated therein, on the semiconductor layer;

(iv) a second transparent electrode layer opposed to the first transparent electrode layer and separated from the film of montmorillonite by means of insulators; said second transparent electrode, said film of montmorillonite, and said insulators forming a hollow space; and

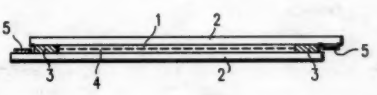
(v) a solution containing an electrolyte and an electron donor in said hollow space.

4,886,718

DEVICE FOR REVERSIBLE OPTICAL DATA STORAGE

Manfred Eich, Frankfurt, and Joachim Wendorff, Nauheim, both of Fed. Rep. of Germany, assignors to Röhm GMBH Chemische Fabrik, Darmstadt, Fed. Rep. of Germany

Filed Feb. 3, 1987, Ser. No. 10,546
Claims priority, application Fed. Rep. of Germany, Feb. 4, 1986, 3603266
Int. Cl.[4] C09K *19/00;* G02F *1/03*
U.S. Cl. 430—20 17 Claims



1. A device for reversible optical information storage, comprising:

(i) a pair of transparent substrate plates; and

(ii) a film in contact with said substrate plates and located therebetween, said film comprising a liquid crystal main chain polyester, polyesteramide or polysiloxane polymer in an oriented or disoriented state; and

wherein the information is stored in said film by locally reorienting the said state of said film, whereby said reori-

enting produces a local variation of the ordering of said polymer.

15. A device for reversible optical information storage, comprising:

(i) a pair of transparent substrate plates; and

(ii) a film in contact with said substrate plates and located therebetween, said film comprising a liquid crystal main chain polymer and a dye, whereby the absorption properties of said film are adjusted, said film being in an oriented or disoriented state; and

wherein the information is stored in said film by locally reorienting the said state of said film, whereby said reorienting produces a local variation of the ordering of said polymer.

4,886,719

ELECTROPHOTOGRAPHY PHOTOSENSITIVE MEMBER AND A METHOD FOR FABRICATING SAME

Eiichiro Tanaka; Akio Takimoto; Koji Akiyama; Kyoko Onomichi; Masanori Watanabe, and Chisato Sakahara, all of Osaka, Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed May 4, 1988, Ser. No. 190,093

Claims priority, application Japan, May 7, 1987, 62-111002; Jun. 25, 1987, 62-158221; Jul. 1, 1987, 62-164556

Int. Cl.[4] G03G 5/10

U.S. Cl. 430—58 21 Claims

1. A charge transport layer for use in an electrophotography photosensitive member comprising:

a straight chain compound polymer layer including (i) as main component, a straight chain compound polymer having p-phenylene in the direction of a main chain, and an element of Group VIB at a para-position, said element of Group VIB being selected from the group consisting of S, Se, Te and mixtures thereof; and (ii) oxygen atom,

said straight chain compound polymer layer having been subjected to a thermal treatment process in a oxygen containing atmosphere so as to improve the hardness thereof.

4,886,720

PHOTOSENSITIVE MEDIUM HAVING A STYRYL CHARGE TRANSPORT MATERIAL

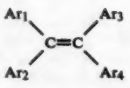
Hideaki Ueda, Kawanishi, Japan, assignor to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed Aug. 31, 1987, Ser. No. 90,911

Int. Cl.[4] G03G 5/10

U.S. Cl. 430—58 13 Claims

1. A photosensitive medium of the function divided type for electrophotography having a charge generating layer and a charge transporting layer which are formed on an electrically conductive substrate, wherein the charge transporting layer comprises a binder resin and a styryl compound represented by the following Formula (I):



wherein Ar_1 is an aryl group having a substituent which is an alkyl group, an alkoxy group, a disubstituted amino group, or a halogen atom and Ar_2, Ar_3, and Ar_4 are each an aryl group or a substituted aryl group.

4,886,721

ELECTROPHOTOGRAPHIC PLATE BY USE OF METAL NAPHTHALOCYANINE DERIVATIVE

Shigeru Hayashida; Seiji Tai; Nobuyuki Hayashi; Yasushi Iwakabe; Noriyuki Kinjo, and Shunichi Numata, all of Hitachi, Japan, assignors to Hitachi Chemical Company, Ltd. and Hitachi, Ltd., both of Tokyo, Japan

Filed Jan. 25, 1988, Ser. No. 147,694

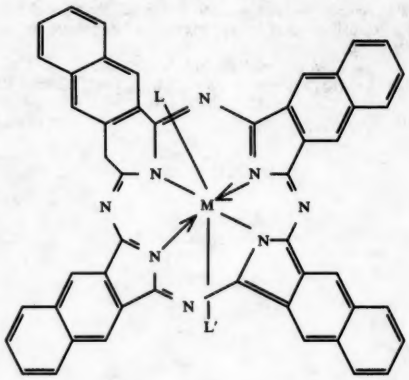
Claims priority, application Japan, Jan. 29, 1987, 62-19155

Int. Cl.[4] G03G 5/14, 5/06

U.S. Cl. 430—59 13 Claims

1. An electrophotographic plate comprising a photoconductive layer containing an organic photoconductive substance on an electroconductive support, characterized in that said photoconductive layer has a charge transport layer and a film containing as the organic photoconductive substance a metal naphthalocyanine derivative represented by the formula (I):

(I)



wherein M represents germanium or tin; L and L' each independently represent a halogen, a hydroxyl group, an alkyl group, an alkoxy group or a siloxy group of the formula $R_1R_2R_3SiO$— (wherein R_1, R_2 and R_3 each independently represent a hydrogen atom, an alkyl group, an alkoxy group or an aryl group).

4,886,722

PHOTOCONDUCTIVE IMAGING MEMBERS WITH UNSYMMETRICAL SQUARAINE COMPOSITIONS

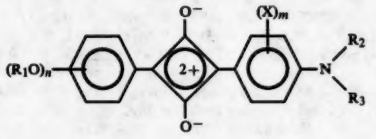
Kock-Yee Law, Fairport, and F. Courtney Bailey, Webster, both of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Filed Apr. 29, 1988, Ser. No. 187,777

Int. Cl.[4] G03G 5/06

U.S. Cl. 430—59 45 Claims

1. A photoconductive imaging member comprised of a supporting substrate, a hole transport layer, and a photogenerating layer comprising the unsymmetrical squaraines of the formula



wherein R_1, R_2 and R_3 are independently selected from alkyl groups; X is hydrogen, hydroxy, alkyl, alkoxy, or halogen; n is a number of 1 to about 3; and m is a number of from 0 to about 2.

4,886,723

LIGHT RECEIVING MEMBER HAVING A MULTILAYERED LIGHT RECEIVING LAYER COMPOSED OF A LOWER LAYER MADE OF ALUMINUM-CONTAINING INORGANIC MATERIAL AND AN UPPER LAYER MADE OF NON-SINGLE-CRYSTAL SILICON MATERIAL

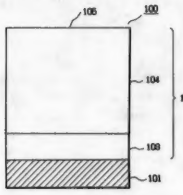
Tatsuyuki Aoike; Masafumi Sano; Takehito Yoshino; Toshimitsu Kariya, and Hiroaki Niino, all of Nagahama, Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Apr. 15, 1988, Ser. No. 182,156

Claims priority, application Japan, Apr. 21, 1987, 62-98272; Apr. 25, 1987, 62-102451; May 6, 1987, 62-111621; May 7, 1987, 112162; Jun. 29, 1987, 62-161537; Aug. 5, 1987, 62-196565; Aug. 6, 1987, 62-197828; Dec. 15, 1987, 62-315095

Int. Cl.[4] G03G *5/082, 5/14*

U.S. Cl. 430—65 26 Claims



1. A light receiving member having an aluminum support and a multilayered light receiving layer exhibiting photoconductivity formed on said aluminum support, characterized in that said multilayered light receiving layer comprises: (a) a lower layer in contact with said support and (b) an upper layer having a free surface disposed on said lower layer (a); said lower layer (a) comprising an inorganic material composed of aluminum atoms, silicon atoms, hydrogen atoms and atoms of an element capable of contributing to the control of image quality selected from the group consisting of boron, gallium, indium, thallium, phosphorus, arsenic, antimony, bismuth, sulfur, selenium, tellurium and polonium; said lower layer (a) having a portion in which said aluminum, silicon and hydrogen atoms are unevenly distributed across the layer thickness; said aluminum atoms being contained in said lower layer (a) such that their content decreases across the layer thickness in a direction upward from the interface between said lower layer (a) and said aluminum support and wherein said content of aluminum atoms is lower than 95 atomic % in the vicinity of the interface between said lower layer (a) and said aluminum support and higher than 5 atomic % in the vicinity of the interface between said lower layer (a) and said upper layer (b); said upper layer (b) comprising a plurality of layers regions, each said region comprising a non-single-crystal material composed of silicon atoms as the matrix, and wherein the layer region adjacent said lower layer (a) comprises a non-single-crystal material composed of silicon atoms as the matrix and at least one kind of atoms selected from the group consisting of hydrogen atoms and halogen atoms.

4,886,724

PHOTOSENSITIVE MEMBER HAVING AN OVERCOAT LAYER AND PROCESS FOR MANUFACTURING THE SAME

Kenji Masaki; Izumi Osawa; Masanori Fujiwara; Isao Doi, and Yumiko Takedomi, all of Osaka, Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed Mar. 7, 1988, Ser. No. 164,891

Claims priority, application Japan, Mar. 9, 1987, 62-53628; Mar. 9, 1987, 62-53629; Mar. 9, 1987, 62-53630; Mar. 9, 1987, 62-53631

Int. Cl.[4] G03G *5/14*

U.S. Cl. 430—66 11 Claims

1. A photosensitive member comprising:

an electrically conductive substrate;

a photoconductive layer comprising an organic material and having a charge retaining function and a charge transporting function; and

an overcoat layer formed on said photoconductive layer and comprising amorphous carbon containing hydrogen, said overcoat layer containing at least one element selected from the group consisting of chalcogen and elements of Group III, IV and V of the periodic table, said overcoat layer having a thickness of from about 0.01 to about 5 microns and being formed by plasma polymerization.

4,886,725

TONER COMPOSITION CONTAINING ORGANOTIN OXIDE

Katsuhiko Tanaka, Tokyo, and Hiroshi Fukumoto, Kawasaki, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

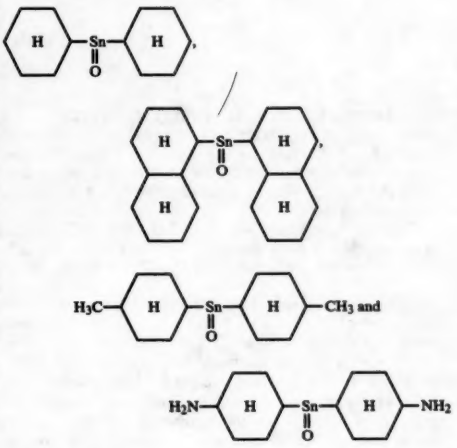
Continuation of Ser. No. 809,766, Dec. 17, 1985, abandoned. This application Sep. 14, 1987, Ser. No. 96,780

Claims priority, application Japan, Dec. 19, 1984, 59-267970; Dec. 19, 1984, 59-267972; Dec. 19, 1984, 59-267975; Dec. 19, 1984, 59-267976

Int. Cl.[4] G03G *9/08, 9/14*

U.S. Cl. 430—106.6 8 Claims

1. A positively chargeable toner for developing electrostatic latent images, comprising binder resin, colorant and a dicycloalkyltin oxide selected from the group consisting of the formulae:



6. The toner according to claim 1, which further contains a magnetic material.

4,886,726

GLYCERIDES AS CHARGE DIRECTORS FOR LIQUID ELECTROSTATIC DEVELOPERS

Dominic M. Chan, Wilmington, Del.; Lyla M. El-Sayed, West Chester; Chandrakant B. Thanawalla, Exton, both of Pa., and Torence J. Trout, Wilmington, Del., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Nov. 25, 1987, Ser. No. 125,503

Int. Cl.[4] G03G *9/12*

U.S. Cl. 430—115 53 Claims

1. An improved electrostatic liquid developer consisting essentially of

(A) a nonpolar liquid having a Kauri-butanol value of less than 30, present in a major amount,

(B) at least one thermoplastic resin having an average by area particle size of less than 10 μm, and

(C) at least one glyceride charge director of the formula:

wherein each of X, Y and Z, which can be the same or different, is

wherein R is alkyl, substituted alkyl, alkylene, or substituted alkylene, wherein alkyl or alkylene contains 1 to 100 carbon atoms.

4,886,727

METHOD FOR DEVELOPING NEGATIVE PHOTORESISTS

Morris Anschel, Binghamton; Lawrence D. Goodrich, Newark Valley, both of N.Y., and Barton M. Hetrick, Wayne, Pa., assignors to International Business Machines Corporation, Armonk, N.Y.

Continuation-in-part of Ser. No. 97,319, Sep. 11, 1987, abandoned, which is a continuation of Ser. No. 801,635, Nov. 25, 1985, abandoned. This application Oct. 21, 1988, Ser. No. 260,820

Int. Cl.[4] G03C *5/00*

U.S. Cl. 430—311 16 Claims

1. A process for developing exposed images in negative isoprene photoresists for the fabrication of integrated circuits comprising treating a substrate coated with the photoresist with a heated mixture of trichloroethane and from about 5 weight % to about 17 weight % of a short chain aliphatic alcohol, said alcohol being present in an amount up to that forming a constant boiling mixture.

4,886,728

USE OF PARTICULAR MIXTURES OF ETHYL LACTATE AND METHYL ETHYL KETONE TO REMOVE UNDESIRABLE PERIPHERAL MATERIAL (E.G. EDGE BEADS) FROM PHOTORESIST-COATED SUBSTRATES

Thomas E. Salamy, North Kingstown, R.I.; Marvin L. Love, Jr., Mesa, and Mark E. Towner, Gilbert, both of Ariz., assignors to Olin Hunt Specialty Products Inc., West Paterson, N.J.

Filed Jan. 6, 1988, Ser. No. 141,128

Int. Cl.[4] B05D *5/12, 3/12*

U.S. Cl. 430—331 11 Claims

1. A process for removing unwanted photoresist material from the peripheral areas of a photoresist substrate comprising the steps of:

(a) spin coating a photoresist solution onto a surface of a substrate, thereby applying a photoresist coating which comprises a uniform film over substantially all of said substrate surface except for unwanted photoresist material deposits at the peripheral areas of said surface;

(b) contacting said peripheral areas of the coated substrate with a sufficient amount of a solvent mixture comprising a mixture of ethyl lactate and methyl ethyl ketone present in a volume ratio of about 65:35 to about 25:75, respectively, to selectively dissolve said unwanted deposits without adversely affecting said uniform film; and 1

(c) separating said dissolved deposits from said coated substrate.

4,886,729

POSITIVELY CHARGED LIQUID DEVELOPER COMPOSITIONS

Bernard Grushkin, Pittsford; David E. Hutka; Louis V. Isganitis, both of Rochester, and Edward J. Radigan, Hamlin, all of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Filed Jul. 15, 1988, Ser. No. 219,117

Int. Cl.[4] G03G *9/16*

U.S. Cl. 430—114 15 Claims

1. A positively charged liquid developer composition comprised of polymer particles, a hydrocarbon liquid component, a charge director comprised of lecithin, and as pigment particles the beta crystalline form K7080 of copper phthalocyanine.

4,886,730

LIQUID DEVELOPER FOR ELECTROSTATIC PHOTOGRAPHY

Ikuo Oto, Tsukui; Hayato Hyakutake, Hino, and Ryo Kobirumaki, Hachioji, all of Japan, assignors to Iwatsu Electric Co., Ltd., Tokyo, Japan

Filed Jul. 11, 1988, Ser. No. 217,767

Claims priority, application Japan, Jul. 29, 1987, 62-187786; Oct. 28, 1987, 62-270248

Int. Cl.[4] G03G *9/16, 15/10*

U.S. Cl. 430—137 28 Claims

1. A process for supplementing a liquid developer in an electrostatic photography apparatus, comprising supplying a starting liquid developer to an electrostatic photography apparatus, the starting liquid developer containing a colorant, a binder and a charge control agent in a nonpolar insulating carrier liquid; consuming a portion of the starting liquid developer such that it becomes difficult to obtain an adequate electrostatic photography image when using the starting liquid developer; and then supplementing a supplemental liquid developer in the electrostatic photography apparatus, characterized by the improvement in that the supplemental liquid developer has a composition of a colorant, a binder and a charge control agent in a nonpolar insulating carrier liquid, different from a composition of the starting liquid developer such that the supplemented liquid developer in the electrostatic photography apparatus maintains a state of charge of the colorant and the binder within a predetermined state suitable for electrostatic photography.

4,886,731

MULTILAYER PHOTOPOLYMERIC PRINTING PLATES WITH PHOTOREACTIVE DIAZO COMPOUNDS AND PHOTOPOLYMERIZABLE COMPOSITIONS

Maria T. Sypek, Chicopee, and Thomas P. Rorke, Holyoke, both of Mass., assignors to Cookson Graphics Inc., Holyoke, Mass.

Continuation of Ser. No. 891, Jan. 5, 1987, abandoned. This application May 10, 1989, Ser. No. 351,262

Int. Cl.[4] G03C *1/52, 1/60, 1/70, 1/94*

U.S. Cl. 430—156 9 Claims

1. A printing plate comprising an aluminum substrate having a silicate coating on at least one surface thereof, said silicate coated surface having greater than two additional coating layers applied thereto, wherein the first of said additional layers comprises a water-soluble photoreactive lithographic diazo, the second of said additional layers comprises a solvent-soluble photoreactive lithographic diazo and a tri-functional acrylate monomer and the third of said layers comprises a photoinitiator, an acrylate oligomer, said tri-functional acrylate monomer and said solvent-soluble lithographic diazo, wherein a greater amount of said tri-functional acrylate monomer is in said second layer relative to said third layer, and wherein said tri-functional acrylate monomer interacts with said photoinitiator and acrylate oligomer to polymerize photo exposed areas of said plate.

4,886,732

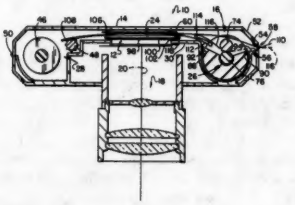
35 MM SELF-DEVELOPING TRANSPARENCY FILM ASSEMBLAGE

Donald E. Mauchan, Marlboro, and Alfred E. Corrigan, Peabody, both of Mass., assignors to Polaroid Corporation, Cambridge, Mass.

Filed Nov. 21, 1988, Ser. No. 274,400

Int. Cl.[4] G03D *9/02;* G03C *3/00*

U.S. Cl. 430—210 11 Claims



1. A photographic film assemblage for use in photographic apparatus having a spread roller assembly through which a film chip of the film assembly is adapted to be advanced to initiate the formation of a visible image within the film chip, said film assemblage comprising:

a chip of instant film having leading and trailing ends, said film chip includes a lens facing surface, a rearwardly located opaque sheet, image-receiving and image-recording layers located therebetween, and a rupturable container of processing liquid;

a first leader for initially protecting said film chip from inadvertent exposure during loading of said photographic film assemblage into a photographic apparatus, said first leader being opaque and having first and second opposite ends and an intermediate portion, said first leader being folded in lighttight relation about said film chip with said first end being detachably secured to said leading end of said film chip and being directed in a first direction across said lens facing surface and then folded about said trailing end of said film chip and redirected in a second direction across said opaque sheet to a point where it terminates in said second end;

a second leader having first and second opposite ends and an intermediate portion, said first end of said second leader being attached to said film chip and said intermediate portion being detachably connected to said intermediate portion of said first leader;

an opaque shade having a first end detachably connected to said leading end of said film chip, and a free second end; and

said film assemblage being adapted to be positioned within the photographic apparatus with said second end of said first leader bypassing the spread roller assembly and extending to the exterior of the photographic apparatus via an egress therein, and said film chip supported in position for its photographic exposure, whereby manually pulling said exteriorly located second end of said first leader results initially in detaching its first end from said film chip and uncovering said lens facing surface of said film chip for subsequent exposure while also moving said second end of said second leader between a pair of rollers of the spread roller assembly and to the exterior of the photographic apparatus, whereby, subsequent to the exposure of the film chip, said second end of said second leader is adapted to be manually pulled so as to draw said film chip through the rollers, which are adapted to rupture said container of processing liquid and spread its contents across said image-recording layer to initiate the formation of a visible image within said image-receiving layer, and to the exterior of the photographic apparatus while said opaque shade is being moved into engagement with said lens facing surface so as to define, in cooperation with said opaque sheet of said film chip, a substantially lighttight envelope for preventing further exposure of said image-recording layer to the ambient light as it exits from the photographic apparatus.

4,886,733

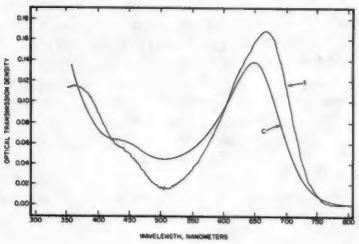
PHOTOGRAPHIC PRODUCTS AND PROCESSES

Myron S. Simon, West Newton, Mass., assignor to Polaroid Corporation, Cambridge, Mass.

Filed Oct. 3, 1988, Ser. No. 252,661

Int. Cl.[4] G03C *5/54, 5/26;* C07D *311/78*

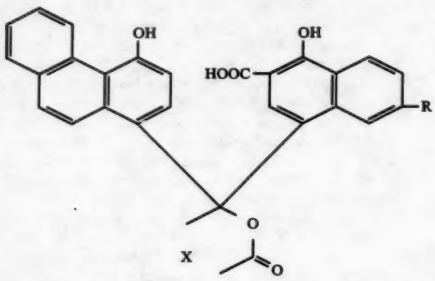
U.S. Cl. 430—221 23 Claims



1. In a photographic film unit adapted for forming a transfer image viewable as a reflection print including a negative component comprising a photosensitive silver halide emulsion carried on a support; a positive component comprising an image-receiving layer carried on a transparent support; an acid-reacting layer disposed in at least one of said negative and positive components; and an aqueous alkaline processing composition comprising a light-reflecting pigment and at least one light-absorbing, pH sensitive optical filter agent releasably contained in a rupturable container positioned to release said composition for distribution between said negative and said positive components, the combination of said light-reflecting

pigment and said optical filter agent being effective to prevent further exposure of said photosensitive emulsion during processing in the presence of radiation actinic to said emulsion and said light-reflecting pigment providing a layer after development which is effective to mask said photosensitive layer and provide a background for viewing the transfer image by reflected light;

the improvement which comprises employing as said processing composition, an aqueous alkaline solution comprising a light-reflecting pigment and as at least one said light-absorbing pH-sensitive optical filter agent, a pH-sensitive phthalein of the formula



wherein R is alkoxy having at least 12 carbon atoms and X represents the carbon atoms necessary to complete phthalide or naphthalide.

4,886,734

ELECTRON-BEAM POSITIVE POLYIMIDE

James A. Moore; Andrew N. Dasheff, both of Troy, and Frank B. Kaufman, Amawalk, all of N.Y., assignors to Rensselaer Polytechnic Institute, Troy and International Business Machines Corporation, Armonk, both of, N.Y.

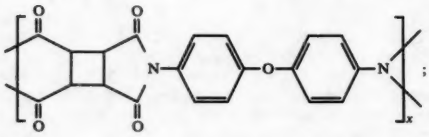
Filed Sep. 26, 1988, Ser. No. 240,392

Int. Cl.[4] G03C *1/495*

U.S. Cl. 430—270 6 Claims

1. A method of forming a patterned layer comprising:

forming a layer of insoluble polyimide having the formula:



irradiating the layer with an electron beam to produce exposed and unexposed areas in the layer, the exposed areas becoming soluble; and

dissolving the exposed areas from the layer using a solvent to form the patterned insoluble layer.

4,886,735

PHOTOPOLYMERIZABLE RECORDING MATERIALS AND PHOTORESIST LAYERS AND LITHOGRAPHIC PRINTING PLATES BASED THEREON

Andreas Boettcher, Leimen; Martin Fischer; Reinhard Aldag, both of Ludwigshafen, and Thomas Bluemel, Erpolzheim, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Filed May 17, 1988, Ser. No. 195,008

Claims priority, application Fed. Rep. of Germany, May 21, 1987, 3717037

Int. Cl.[4] G03C *1/68, 1/70*

U.S. Cl. 430—332 20 Claims

1. A photopolymerizable recording material, comprising:

(i) one or more photopolymerizable olefinically unsaturated organic compounds,

(ii) one or more photopolymerization initiators,

(iii) a senitizer, and

(iv) a color-forming system, comprising:

(a) one or more colorless or virtually colorless organic compounds which are oxidizable to colored compounds, and

(b) a photooxidant for the colorless or virtually colorless organic compound(s) (a), wherein photooxidant (b) comprises an organic salt with a substituted or unsubstituted hetaromatic system, this hetaromatic system having one or more built-in groups of the formula (I)

(I)

where R is substituted or unsubstituted alkenyl, alkynyl, hetaryl, alkenylcarbonyl, alkynecarbonyl, carbamoyl, alkylsulfonyl or arylsulfonylaminousulfinyl, substituted cycloalkyl or a substituted or unsubstituted hetaryl cation, with the proviso that the miximum of the long-wave absorption band of the salt is below 400 nm.

4,886,736

SILVER HALIDE COLOR PHOTOGRAPHIC MATERIAL

Koki Nakamura; Kei Sakanoue, and Seiji Ichijima, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Jun. 12, 1987, Ser. No. 65,194

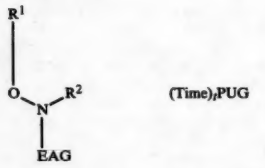
Claims priority, application Japan, Jun. 12, 1986, 61-136947

The portion of the term of this patent subsequent to Nov. 8, 2005, has been disclaimed.

Int. Cl.[4] G03C *7/18, 7/32*

U.S. Cl. 430—359 16 Claims

13. A method for forming an image comprising imagewise exposing to light and then processing a silver halide color photographic material with a developing solution containing a paraphenylenediamine as a developing agent, said material comprising a color coupler and (1) at least one compound represented by formula (I)



(I)

wherein EAG represents a group capable of accepting an electron from a reducing substance; R^1 and R^2 each represents a substituent other than a hydrogen atom, and when R^1 and R^2 is bonded to —(Time)$_t$—PUG, R^1 or R^2 is a single bond or

divalent substituent, and R^1 and R^2 may be bonded to each other to form a cyclic structure; Time represents a group capable of releasing PUG, which is released by the cleavage of the single bond between the oxygen atom and the nitrogen atom in the compound; t represents 0 or 1; PUG represents a dye moiety which masks to correct subabsorption of a dye formed from said coupler, wherein said dye moiety is temporarily shifted to a short wavelength; the dotted lines mean that at least one of them forms a chemical bond, wherein the release of PUG is triggered by the cleavage of the N—O single bond which occurs when EAG accepts an electron, and wherein the shifted dye moiety is non-diffusible and after being temporarily shifted to a shorter wavelength is shifted to a longer wavelength after release.

4,886,737

STABILIZATION OF A PHOTOGRAPHICALLY PRODUCED SILVER IMAGE

Werner Berthold; Paul Marx, both of Leverkusen, and Öhlschläger, Bergisch-Gladbach, all of Fed. Rep. of Germany, assignors to Agfa-Gevaert Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed Sep. 19, 1988, Ser. No. 245,558

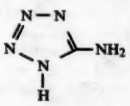
Claims priority, application Fed. Rep. of Germany, Oct. 2, 1987, 3733291

Int. Cl.[4] G03C *7/40*

U.S. Cl. 430—372 **1 Claim**

1. In the photographic process of stabilizing a finished photographic silver image obtained from a silver halide emulsion layer, by exposing, developing, fixing and washing the emulsion

the step of treating said emulsion in an after-treatment bath comprising a solution of aminotetrazole of the following formula:



said aminotetrazole being present in the bath in a concentration of from 1.5 to 4% by weight.

4,886,738

SILVER HALIDE COLOR PHOTOGRAPHIC MATERIAL

Naoyasu Deguchi; Sadao Kamei; Kensuke Goda; Sadanobu Shuto, and Yasuhiro Hayashi, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

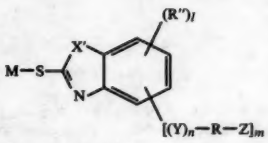
Filed Oct. 5, 1987, Ser. No. 104,130

Claims priority, application Japan, Oct. 3, 1986, 61-235764

Int. Cl.[4] G03C *1/84, 1/06*

U.S. Cl. 430—510 **16 Claims**

1. A silver halide color photographic material comprising a support having thereon at least one silver halide photographic emulsion layer and at least one layer containing colloidal silver, wherein said colloidal silver-containing layer comprises at least one compound selected from the group consisting of compounds of general formulae (I) and (II) below, and wherein at least one layer selected from a photosensitive silver halide emulsion layer farthest from the support and any other layer positioned between said photosensitive layer and said support comprises a silver halide emulsion containing internally-fogged or surface-fogged silver halide grains:



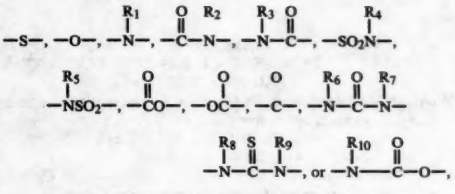
(I)

wherein

R represents a linear or branched alkylene group, a linear or branched alkenylene group, a linear or branched aralkylene group, or an arylene group;

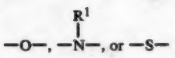
Z represents a polar substituent,

Y represents



in which each of R_1, R_2, R_3 R_4, R_5, R_6, R_7, R_8, R_9 and R_{10}, which may be the same or different, represents a hydrogen atom or a substituted or unsubstituted alkyl group, substituted or unsubstituted aryl group, substituted or unsubstituted alkenyl group or substituted or unsubstituted aralkyl group;

X' represents



in which R' represents a hydrogen atom or a substituted or unsubstituted alkyl group or substituted or unsubstituted alkenyl group;

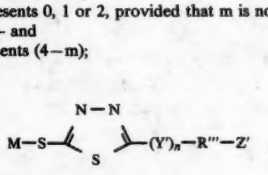
R'' represents a hydrogen atom or a group capable of replacing it;

M represents a hydrogen atom, an alkali metal atom, an ammoniumyl group or a group capable of being split off under alkaline conditions;

n represents 0 or 1;

m represents 0, 1 or 2, provided that m is not 0 when X' is —S— and

l represents (4—m);

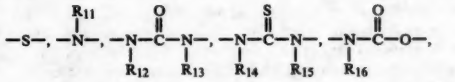


(II)

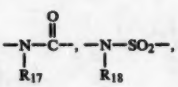
wherein R''' represents a linear or branched alkylene group, a linear or branched alkenylene group, a linear or branched aralkylene group or arylene group;

Z' represents a hydrogen atom or a polar substituents;

Y' represents



-continued



in which each of R_{11}, R_{12}, R_{13}, R_{14}, R_{15}, R_{16}, and R_{18}, which may be the same or different, represents a hydrogen atom, or a substituted or unsubstituted alkyl group, substituted or unsubstituted aryl group, substituted or unsubstituted alkenyl group, or substituted or unsubstituted aralkyl group; and

n represents 0 or 1.

4,886,739

THERMALLY PROCESSABLE IMAGING ELEMENT AND PROCESS

Wojciech M. Przezdziecki, Pittsford, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Aug. 10, 1988, Ser. No. 230,643

Int. Cl.[4] G03C *1/02*

U.S. Cl. 430—617 19 Claims

1. A photothermographic or thermographic imaging element comprising a support bearing at least one photothermographic or thermographic layer comprising a photothermographic or thermographic imaging composition and 2.5 to 20% by weight of the layer of at least one hydrolyzed polyalkoxysilane.

4,886,740

ENZYME-ELECTRODE SENSOR WITH ORGANOSILANE TREATED MEMBRANE

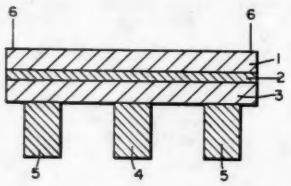
Pankaj M. Vadgama, Newcastle-Upon-Tyne, England, assignor to Imperial Chemical Industries PLC, London, England

Filed May 28, 1986, Ser. No. 867,439

Claims priority, application United Kingdom, Jun. 5, 1985, 8514176

Int. Cl.[4] C12Q *1/00;* G01N *27/26*

U.S. Cl. 435—4 6 Claims



1. A sensor of the enzyme-electrode type, comprising a sensor and a membrane thereon which is permeable to liquids and solutes, wherein the membrane comprises a first layer of polymeric material forming that face of the membrane which is nearer to the sensor, an enzyme-containing layer, and at least one further layer of polymeric material on that side of the enzyme-containing layer which is remote from said first layer, at least one of said at least one further layers being of a type which has been treated by being exposed to contact with a medium containing an organosilane.

4,886,741

USE OF VOLUME EXCLUSION AGENTS FOR THE ENHANCEMENT OF IN SITU HYBRIDIZATION

Dennis E. Schwartz, Redmond, Wash., assignor to Microprobe Corporation, Bothel, Wash.

Filed Dec. 9, 1987, Ser. No. 130,709

Int. Cl.[4] C12Q *1/70, 1/68;* G01N *33/53, 33/566*

U.S. Cl. 435—5 12 Claims

1. A method for the in situ detection of polynucleotide targets in cells, comprising:

(a) fixing the cells to an inert, transparent, and solid support;

(b) contacting the fixed cells with a hybridization mixture comprising labeled short probes or between 15 and 30 nucleotides having a nucleotide sequence capable of hybridizing to the polynucleotide targets and a volume exclusion agent at a concentration of 2% to 25% (w/v) of the hybridization mixture;

(c) washing excess short probes from the solid support, wherein steps (b) and (c) are completed in 4 hours or less; and

(d) detecting labeled probes hybridized to said cells, wherein said detecting of probe is correlated to detection of said polynucleotide targets.

4,886,742

ENZYME IMMUNOASSAY FOR DETECTING HIV ANTIGENS IN HUMAN SERA

Kenneth H. Kortright, Cooper City; David E. Hofheinz, Homestead; Meryl A. Forman, Miami; Song Y. Lee, Plantation; Paulette E. Smariga, N. Miami, and Candie S. Stoner, Hollywood, all of Fla., assignors to Coulter Corporation, Hialeah, Fla.

Continuation-in-part of Ser. No. 61,979, Jun. 15, 1987. This application Nov. 6, 1987, Ser. No. 118,149

Int. Cl.[4] G01N *33/577, 33/569*

U.S. Cl. 435—5 12 Claims

1. An immunoassay for detecting HIV antigens in a human physiological fluid test sample containing cells and which sample may have circulating antigen, said assay comprising:

(a) introducing into contact with a solid surface to which is bound a known quantity of a monoclonal antibody capable of binding to a common epitope of the HIV p55, p24, p39 and p33 core antigens and without binding the HIV p18 core antigen and HIV envelope antigens, a predetermined volume of the test sample;

(b) incubating said test sample in contact with said surface to form resultant antigen-antibody complexes; and

(c) incubating the resultant complexes and subjecting same to a labelled human anti-HIV antibody conjugate which is capable of yielding a quantitatively measurable signal correlated to the signal for a normal negative test sample to indicate either antigen positive or negative for the test sample with picogram sensitivity of at least approximately 7.8 picograms per milliliter of test sample within a period of approximately four hours from the time of commencement of the immunoassay.

4,886,743

DIAGNOSTIC REAGENTS BASED ON UNIQUE SEQUENCES WITHIN THE VARIABLE REGION OF THE T CELL RECEPTOR AND USES THEREOF

Leroy E. Hood, Pasadena; Irving L. Weissman, Stanford, and Michael S. McGrath, Menlo Park, all of Calif., assignors to California Institute of Technology, Pasadena, Calif.

Filed Apr. 24, 1985, Ser. No. 726,502

Int. Cl.[4] C12Q *1/68;* G01N *33/53, 33/569;* C07K *7/10*

U.S. Cl. 435—5 57 Claims

1. A method of diagnosing a specific disease in a subject which comprises:

a. obtaining from the subject suspected of having the specific disease a suitable sample containing T cells;

b. contacting the sample under appropriate conditions with

a reagent (1) capable of binding to T cells and (2) indicative of the presence of, and having specificity for, a unique amino acid sequence within the variable region of the β chain of the T cell receptor, the presence of an increased number of cells carrying the unique sequence relative to the number of cells carrying the sequence present in a normal subject being associated with the specific disease, so as to form a detectable complex between the reagent and T cells which contain the unique sequence and are present in the sample; and

c. quantitatively determining the number of the T cells carrying the sequence present in the complex, comparing the number so determined with the number of T cells carrying the sequence determined for a normal subject using the same procedure and thereby diagnosing the specific disease.

4,886,744

FLUORESCENT CONJUGATES AND BIOLOGICAL DIAGNOSTIC ASSAY SYSTEM

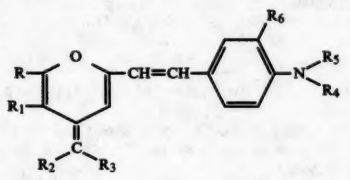
Michael J. Arnost, North Andover; Shai Inbar, Brookline; Frank A. Meneghini, Arlington; Paul S. Palumbo, West Newton; Stephen G. Stroud, Medford, and Charles M. Zepp, Berlin, all of Mass., assignors to Polaroid Corporation, Cambridge, Mass.

Continuation-in-part of Ser. No. 727,126, Apr. 25, 1985, abandoned. This application Apr. 10, 1986, Ser. No. 850,123

Int. Cl.[4] C12Q *1/68;* **G01N** *33/533*

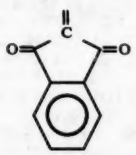
U.S. Cl. 435—6 **12 Claims**

1. A fluorescent conjugate comprising a biologically active moiety selected from the group consisting of a DNA probe, an antigen, an antibody, a hapten and an Fab fragment which is attached to a dye moiety by a substantially achromophoric divalent linking moiety, said dye moiety represented by the formula:



wherein R is alkyl having from 1 to 6 carbon atoms or a hydrophilic group; R_1 is hydrogen; or when R and R_1 are taken together they represent the carbon atoms necessary to form a fused benz ring;

R_2 and R_3 are each independently —CN, COR_7, $COOR_8$ or phenyl substituted with —CN, COR_7, $COOR_8$, or when R_2 and R_3 are taken together with the carbon atom to which they are attached they represent a group represented by



R_4 and R_5 are each independently alkyl having from 1 to 6 carbon atoms or a hydrophilic group; or R_5 when taken together with R_6 is $—(CH_2—)_2$;

R_6 is hydrogen;

R_7 is alkyl having from 1 to 6 carbon atoms or phenyl and;

R_8 is alkyl having from 1 to 6 carbon atoms, phenyl or a hydrophilic group;

provided that at least one of R, R_4, R_5 or R_8 is a hydrophilic group and wherein said biologically active moiety is attached to said dye moiety through any of the positions occupied by R, R_2, R_3, R_4 or R_5.

4,886,745

MONOCLONAL ANTIBODY SPECIFIC FOR HUMAN BASAL CELL SURFACE ANTIGEN

Vera Morhenn, Palo Alto, Calif., assignor to Syntex Inc., Palo Alto, Calif.

Filed Mar. 30, 1984, Ser. No. 595,075

Int. Cl.[4] G01N *33/577*

U.S. Cl. 435—7 **10 Claims**

1. A monoclonal antibody that binds to an antigenic site on a protein characteristic of a human basal cell surface and a human malignant squamous cell and binding fragments of said antibody, wherein said protein is characterized as having a molecular weight of about 120,000 daltons as determined by polyacrylamide gel electrophoresis.

4,886,746

HEAT-STABLE, SALT-TOLERANT MICROBIAL XANTHANASE

Martin C. Cadmus, and Morey E. Slodki, both of Peoria, Ill., assignors to The United States of America as represented by the Secretary of Agriculture, Washington, D.C.

Filed May 10, 1988, Ser. No. 192,083

Int. Cl.[4] C12P *39/00;* **C12N** *9/42, 1/20;* **C12R** *1/01*

U.S. Cl. 435—42 **1 Claim**

1. A mixed bacterial culture having the identifying characteristics of ARS Culture Collection Accession No. NRRL B-18445; said culture being capable of producing xanthanase enzymes which are functional up to 65° C.

4,886,747

NUCLEIC ACID ENCODING TGF-β AND ITS USES

Rik M. A. Derynck, So. San Francisco, and David V. Goeddel, Hillsborough, both of Calif., assignors to Genentech, Inc., South San Francisco, Calif.

Continuation-in-part of Ser. No. 715,142, Mar. 22, 1985, abandoned. This application Mar. 13, 1987, Ser. No. 25,423

Int. Cl.[4] C12P *21/00, 21/02;* **C12N** *15/00, 5/00*

U.S. Cl. 435—69.4 **27 Claims**

1. A method comprising (a) constructing a vector which includes nucleic acid encoding biologically active TGF-β, (b) transforming a host eukaryotic cell with the vector, (c) culturing the transformed cell and (d) recovering mature TGF-β from the culture medium.

4,886,748

DNA ENCODING FLAGELLIN AND VECTOR HAVING THE SAME

Junichiro Asaka, Sakai; Tamio Fujiwara, Amagasaki; Takashi Fujiwara, Nara; Goro Kuwajima, Nishinomiya; Eiji Kondo, Ikeda, and Masaru Shin, Kobe, all of Japan, assignors to Shionogi & Co., Ltd., Osaka, Japan

Filed Mar. 11, 1987, Ser. No. 24,992

Claims priority, application Japan, Mar. 11, 1986, 61-54400; Sep. 19, 1986, 61-223484

Int. Cl.[4] C12P *21/00, 21/02;* **C12N** *5/00, 15/00*

U.S. Cl. 435—69.7 **31 Claims**

1. A DNA comprising: a DNA sequence containing the hag gene which encodes flagellin of *Escherichia coli* or a DNA sequence containing said hag gene but lacking an antigenic portion of said hag gene between the base pairs 583 and 1143; and a DNA sequence which encodes a peptide foreign to *Escherichia coli,* wherein said DNA sequence encodes a fused protein which is capable of being excreted through the cell wall of an *Escherichia coli* host.

4,886,749

PROCESS FOR PRODUCING DIADENOSINE TETRAPHOSPHATE AND DERIVATIVES THEREOF

Munehiko Dombou; Isao Tomioka; Senji Kitabatake, and Hiroshi Nakejima, all of Kyoto, Japan, assignors to Unitika Ltd., Amagasaki, Japan

Filed May 28, 1987, Ser. No. 54,975
Claims priority, application Japan, May 28, 1986, 61-122723
Int. Cl.[4] C12P *19/36;* C12N *9/12;* C12R *1/01, 1/07*
U.S. Cl. 435—89 10 Claims

1. A process for producing diadenosine tetraphosphate or a derivative thereof substantially without formation of adenosine triphosphate or derivatives thereof by reacting adenosine-5-triphosphate or a derivative thereof with an an amino acid under the catalytic action of aminoacyl-tRNA synthetase, wherein said reaction is carried out in the presence of an enzyme that convert adenosine-5'-monophosphate to adenosine-5'-diphosphate and an enzyme that converts adenosine-5'diposphate to adenosine-5'-triphosphate.

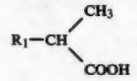
4,886,750

PROCESS FOR THE PREPARATION OF A PHARMACEUTICALLY ACTIVE COMPOUND IN A STEREOSPECIFIC FORM OF THE FORMULA

Mauro A. Bertola; Arthur F. Marx, both of Delft; Hein S. Koger, Spaarndam; Wilhelmus J. Quax, Voorschoten; Cornelis J. Van der Laken, Leiden, all of Netherlands; Gareth T. Phillips, Kent, United Kingdom; Brian W. Robertson, Kent, United Kingdom, and Peter D. Watts, Kent, United Kingdom, assignors to Gist-Brocades N.V., Delft and Shell Internationale Research Mattschappij B.V., The Haag, both of, Netherlands

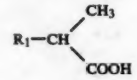
Filed Jan. 6, 1987, Ser. No. 674
Claims priority, application United Kingdom, Jan. 7, 1986, 86-00245
Int. Cl.[4] C12P *41/00, 17/00;* C12N *1/20, 9/18*
U.S. Cl. 435—136 26 Claims

1. A process for the preparation of a pharmaceutically active compound in a stereospecific form of the formula



I

or a pharmaceutically acceptable salt or ester thereof, wherein R_1 is selected from the group consisting of unsubstituted or substituted phenyl, unsubstituted or substituted naphthyl, a heterocyclic ring system, which is unsubstituted or substituted, and a heteroaromatic ring system containing in addition to carbon atoms at least one atom selected from nitrogen, sulphur and oxygen, this ring system being unsubstituted or substituted which comprises subjecting a compound of the formula



I

wherein R_2 is an ester residue to the action of a microorganism or substances derived therefrom, having the esterase ability for stereoselective hydrolysis of compound II into compound I, having at least 80% by weight the S-configuration.

4,886,751

PROCESS FOR THE PRODUCTION OF ETHANOL THROUGH MOLASSES FERMENTATION

Conny Thorsson, Älvsjö, Sweden, assignor to Nobel Chematur AB, Karlskoga, Sweden

PCT No. PCT/SE86/00498, § 371 Date Jun. 20, 1988, § 102(e) Date Jun. 20, 1988, PCT Pub. No. WO87/04724, PCT Pub. Date Aug. 13, 1987
PCT Filed Oct. 30, 1986, Ser. No. 209,476
Claims priority, application Sweden, Jan. 31, 1986, 8600429
Int. Cl.[4] C12P *7/06*
U.S. Cl. 435—162 8 Claims

1. A process for the production of ethanol through fermentation of beet or cane sugar molasses by means of yeast in a fermentor (FI), in which a stream (5) of fermentation liquor with an ethanol content of 3–7% by weight and a content of fermentable material less than 2% by weight is continuously withdrawn from the fermentor, said stream (5) is separated in a centrifugal separation step (C) into a yeast enriched stream (8), which is recirculated to the fermentor (FI), and into an essentially yeast free stream (11), which in a primary distillation step, (PD) is separated into an ethanol enriched top stream (12) and a residual liquid bottoms stream (13), a part of which is recirculated to the fermentor (FI) and the remaining part (17) is supplied to a secondary distillation step (SD) for stripping off remaining ethanol and forming a concentrated ethanol free stillage (20), which is discharged, characterized in that the input of process water is controlled so that during a first period of time the concentration of nonfermentable substance in the fermentor (FI), calculated as water free substance (DS), increases from a starting value in the range of 5 to 15% by weight DS to a value in the range of 20 to 30% by weight DS, in which latter range the ethanol productivity of the yeast decreases, and in that fermentation and distillation with recirculation of said bottoms stream (14) is continued at said last concentration of nonfermentable substance in the fermentor during the second period of time, the average concentration of nonfermentable substance in the fermentor over said two periods of time exceeding 20% by weight DS.

4,886,752

MICROBIAL PRODUCTION OF ULTRAFINE-GRAINED MAGNETITE

Derek R. Lovley, Paris, Va., assignor to The United States of America as represented by the Secretary of the Interior, Washington, D.C.

Filed Sep. 23, 1988, Ser. No. 248,220
Int. Cl.[4] C12P *3/00, 1/04;* C12R *1/01;* C12N *1/22*
U.S. Cl. 435—168 11 Claims

1. A method of producing magnetite comprising culturing under anaerobic conditions a non-magnetotactic microorganism designated GS-15 and deposited at the American Type Culture Collection, bearing accession No. 53774, in the presence of a suitable carbon compound and a ferric iron compound.

4,886,753

METHOD FOR THE EXPRESSION OF GENES IN PLANTS, PARTS OF PLANTS, AND PLANT CELL CULTURES, AND DNA FRAGMENTS, PLASMIDS, AND TRANSFORMED MICROORGANISMS TO BE USED WHEN CARRYING OUT THE METHOD, AS WELL AS THE USE THEREOF FOR THE EXPRESSION OF GENES IN PLANTS,

Kjeld A. Marcker, Egå , and Jens S. Jensen, Århus, both of, assignors to A/S De Danske Sukkerfabrikker, Copenhagen, Denmark

Filed May 2, 1986, Ser. No. 858,924
Claims priority, application Denmark, Jan. 28, 1986, 412/86
Int. Cl.[4] C12N *15/00*
U.S. Cl. 435—172.3 9 Claims

1. A method of expressing an exogenous gene in a legumi-

nous plant part, which comprises transforming said leguminous plant part with a first DNA fragment which comprises a 5' flanking region of a leghemoglobin gene obtained from a different leguminous plant species, said 5' flanking region being

an inducible promoter of said leghemoglobin gene, and a second DNA fragment which encodes the exogenous gene to be expressed, wherein said first DNA fragment is positioned 5' to said second DNA fragment so that said first DNA fragment regulates expression of said exogenous gene.

4,886,754

RECOMBINANT BATERIOPHAGE FOR HETEROLOGOUS CLONING OF BACILLUS MICROORGANISMS AND METHOD FOR ITS PRODUCTION

Richard S. Graham; Yuko Yoneda, and Frank E. Young, all of Rochester, N.Y., assignors to The University of Rochester, Rochester, N.Y.

Continuation of Ser. No. 350,923, Feb. 22, 1982, abandoned, which is a continuation of Ser. No. 110,042, Jan. 7, 1980, abandoned. This application Jun. 3, 1985, Ser. No. 740,312

Int. Cl.[4] C12N *15/00, 9/28, 7/00, 1/20;* **C12P** *21/00;* **C12R** *1/07, 1/125*

U.S. Cl. 435—172.3 **2 Claims**

1. A method for producing and selecting *B. subtilis* recombinant bacteriophage ϕ3T (ATCC 31595-B1) containing the gene encoding biosynthesis of α-amylase suitable for use in heterologous transformation of a lysogenic host Bacillus microorganism which comprises the steps of:

(a) obtaining genetic fragments encoding α-amylase from *B. amyloliquefaciensH* RUB 500 (ATCC 31592);

(b) obtaining DNA fragements from a ϕ3T bacteriophage vector by treating said bacteriophage vector DNA with Bgl II restriction enzyme;

(c) ligating the genetic fragments obtained in step (a) with the DNA obtained in step (b) to produce a mixture containing a series of recombinant molecules suitable for transforming said lysogenic host Bacillus;

(d) incubating the mixture of step (c) with DNA isolated from a *B. subtilis* RUB 200 (ATCC 31593) microorganism which does not contain said genetic fragments obtained in step (a), said RUB 200 microorganism having substantial genetic homology with a host *B. subtilis* RUB 201 (ATCC 31594) and being prototrophic for threonine, to allow for selection of said lysogenic host Bacillus capable of reacting with DNA to provide suitable means for host Bacillus transformed with said desired genetic trait;

(e) incubating the mixture of step (d) with said host *B. subtilis* RUB 201 said host *B. subtilis* RUB 201 being lysogenic for said bacteriophage of step (b) and auxotrophic for threonine to produce a mixture containing host *B. subtilis* RUB 201 transformed into *B. subtilis* RUB 204 (ATCC 31595) which are prototrophic for threonine, lysogenic for said *B. subtilis* recombinant bacteriophage ϕ3T and which contain the gene encoding biosynthesis of α-amylase within said bacteriophage;

(f) selecting said transformed host *B. subtilis* RUB 204 by growing said mixture on a growth medium which does not contain threonine and determining the presence of α-amylase; and

(g) obtaining therefrom *B. subtilis* recombinant bacteriophage ϕ3T (ATCC 31595-B1) containing the gene encoding biosynthesis of α-amylase by inducing said transformed host *B. subtilis* RUB 204.

4,886,755

PREPARATION OF POLYMERIC THIOL GELS FOR COVALENT BONDING OF BIOLOGICALLY ACTIVE LIGANDS

That T. Ngo, Irvine, Calif., assignor to Bioprobe International, Inc., Tustin, Calif.

Continuation of Ser. No. 679,167, Dec. 7, 1984, abandoned. This application Oct. 13, 1987, Ser. No. 110,103

Int. Cl.[4] C12N *9/00, 11/06;* **G01N** *33/547;* **C07K** *17/06*

U.S. Cl. 435—183 **8 Claims**

1. A polymeric thiol gel of the formula

$$—CH_2—S—CH_2—CH(OH)CH(OH)CH_2—SH$$

wherein —CH_2— represents a polymeric substance.

4,886,756

NOVEL RESTRICTION ENDONUCLEASE SPLI AND PROCESS FOR THE PRODUCTION OF THE SAME

Masahide Kawamura; Masaki Sakakibara; Teruo Watanabe, all of Chiba; Akira Obaiashi, Uji; Nobutsugu Hiraoka, Mukou, and Keiko Kita, Kyoto, all of Japan, assignors to Dainippon Ink and Chemicals, Inc., Tokyo and Takara Shuzo Co., Ltd., Kyoto, both of, Japan

Filed Jul. 24, 1985, Ser. No. 758,536

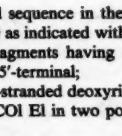
Claims priority, application Japan, Aug. 2, 1984, 59-161609

Int. Cl.[4] C12N *9/22, 9/00, 9/14*

U.S. Cl. 435—199 **2 Claims**

1. An essentially pure restriction endonuclease SPII which has the following physicochemical properties:

(1) recognizing the following base sequence in double-stranded deoxyribonucleic acid molecules:



and cleaving said sequence in the phosphodiester bonds between C and G as indicated with the vertical arrows to produce DNA-fragments having one strand comprising four bases at the 5'-terminal;

(2) cleaving double-stranded deoxyribonucleic acid λ-DNA in one position, COl El in two positionss and ϕX 174 in two positions;

(3) being activated with 5 to 20 mM Mg^{2+};

(4) exhibiting an activity at a NaCl concentration of 0 to 200 mM and having an optimum NaCl concentration of 100 to 120 mM;

(5) having a working pH value of 5.5 to 10.0 and an optimum pH value of 7.0 to 7.5;

(6) having a working temperature of 20° to 65° C. and an optimum temperature of 50° to 55° C.;

(7) being completely inactivated ast 75° C. for 60 min (i.e. temperature stability);

(8) having a molecular weight of approximately 400,000±30,000 when determined by a gel-filtration method; and

(9) being activated 5 to 20 mM Mg^{2+} without requiring ATP or S-adenosyl-methionine as confactors; and which can be produced by culturing *Spirulinas platensis* subspecies *siamese* (ATCC 53843) or M-185 (ATCC 53844), or *Spirulina maxima* UTEX LB-2342 (ATCC 53871) and purifying an

endonuclease having said physicochemical properties from said culture.

4,886,757

SPIRAMYCIN RESISTANCE-CONFERRING CLONING VECTORS

Mark A. Richardson, Indianapolis, Ind., assignor to Eli Lilly and Company, Indianapolis, Ind.

Filed Apr. 15, 1987, Ser. No. 38,689
Int. Cl.[4] C12N *15/00, 1/20*
U.S. Cl. 435—252.3 29 Claims

1. A recombinant DNA cloning vector which comprises

(a) a DNA sequence selected from the group consisting of an origin of replication and integration sequence,

(b) a spiramycin C resistance gene srm C of *Streptomyces ambofaciens* that confers resistance to the antibiotic spiramycin, subject to the limitation that

said origin of replication and integration sequence are functional in Streptomyces and Nocardia.

4,886,758

METHOD OF DETERMINING INCOMPATIBILITY-REACTION-CAUSING SUBSTANCES IN BLOOD PRODUCTS AS WELL AS A METHOD OF INACTIVATING SAID INCOMPATIBILITY-REACTION-CAUSING SUBSTANCES

Johann Eibl; Yendra Linnau, and Otto Schwarz, all of Vienna, Austria, assignors to Immuno Aktiengesellschaft fur Chemisch-Medizinische Produkte, Vienna, Austria

Continuation-in-part of Ser. No. 584,933, Feb. 29, 1984, abandoned, and a continuation of Ser. No. 886,724, Jul. 18, 1986, abandoned. This application Sep. 15, 1986, Ser. No. 907,652
Claims priority, application Austria, Mar. 16, 1983, 931/83
Int. Cl.[4] C07K *3/00, 15/00;* A61K *39/395*
U.S. Cl. 435—269 4 Claims

1. A method of producing a therapeutically or prophylactically applicable immunoglobulin-G-containing fraction from human or animal plasma, which fraction is substantially free from incompatibility-reaction causing substances comprising the following steps:

treating human or animal plasma with ethanol at a temperature of below 0° C., to obtain an immunoglobulin-G-containing precipitate,

removing ethanol from said immunoglobulin-G-containing precipitate to obtain an immunoglobulin-G-containing fraction,

treating said immunoglobulin-G-containing fraction with an immobilized enzyme selected from the group consisting of trypsin, chymotrypsin and pancreas protease at an elevated temperature of about 37° C. to obtain a treated fraction

removing the immobilized enzyme,

precipitating from said treated fraction a purified immunoglobulin substantially comprised of IgG by a protein precipitating agent,

dissolving said precipitate to obtain a solution,

sterile filtering said solution, and lyophilizing.

4,886,759

GERMINATION FLOOR SYSTEMS

Norman H. Andreasen, 1522 Norwood Ave., Itasca, Ill. 60143

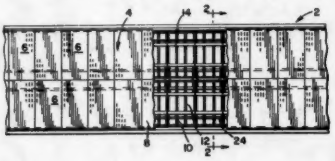
Continuation-in-part of Ser. No. 103,667, Oct. 2, 1987, Pat. No. 4,767,715, which is a division of Ser. No. 687,598, Dec. 31, 1984, Pat. No. 4,698,309. This application Dec. 28, 1987, Ser. No. 138,567
Int. Cl.[4] C12M *1/14;* A01G *31/00*
U.S. Cl. 435—310 15 Claims

1. A germination floor comprising a horizontal support tube;

a floor having a plurality of generally horizontal tray assemblies, said tray assemblies being mounted for pivotal movement about said horizontal support tube;

bearing means for mounting said tray assemblies for pivotal movement about said tube;

and said bearing means includes at least one member disposed about said tube and coupled to one of said tray assemblies, said member having an opening through which said tube is arranged to extend, said opening having



a radius gradually increasing from a vertical point to a greatest radius at generally diametrical horizontal points spaced from said tube, said gradually increasing radius permitting said member to move in a perpendicular direction relative to said axis of said tube during pivotal movement of said at least one tray assembly.

4,886,760

STABLE CHEMICAL COMPOSITIONS CONTAINING CHROMOGENIC MATERIALS, PEROXIDES, AND STABILIZING CHEMICALS

Abraham Ben-Michael, Ramat-Ilan, Israel, assignor to Savyon Diagnostics Limited, Israel

Continuation-in-part of Ser. No. 771,417, Aug. 30, 1985, abandoned. This application Jul. 31, 1986, Ser. No. 891,528
Claims priority, application Israel, Jan. 31, 1985, 74204; Dec. 11, 1985, 77299
Int. Cl.[4] G01N *21/78*
U.S. Cl. 436—66 14 Claims

1. A stable liquid composition containing a chromogen material and hydrogen peroxide, consisting essentially of an aqueous solvent medium, a chromogenic material, hydrogen peroxide, a water miscible organic solvent, a stabilizing unsaturated nitrogen heterocyclic compound and an effective amount of a chelating agent to stabilize said chromogen and hydrogen peroxide containing composition in its liquid state, said aqueous solvent medium being present in sufficient amount to provide a stable liquid composition containing at least 50% water by volume.

4,886,761

POLYSILICON BINDING ASSAY SUPPORT AND METHODS

Eric K. Gustafson, Palo Alto; Rick Trebino, Livermore, and John Lee, Cupertino, all of Calif., assignors to Yellowstone Diagnostics Corporation, Sunnyvale, Calif.

Filed Mar. 26, 1987, Ser. No. 30,327
Int. Cl.[4] G01N *33/543, 33/566, 21/00, 21/06*
U.S. Cl. 436—518 15 Claims

1. A polysilicon binding assay surface having a binding reagent adhered thereto and having a non-specific binding inhiitor adsorbed to the surface thereof.

4,886,762

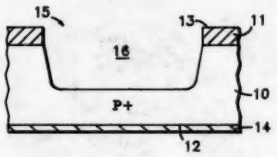
MONOLITHIC TEMPERATURE COMPENSATED VOLTAGE-REFERENCE DIODE AND METHOD FOR ITS MANUFACTURE

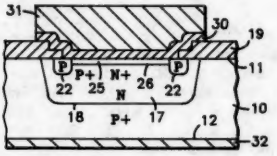
Bernard W. Boland, Scottsdale; William E. Gandy, Jr., Phoenix, and Kevin B Jackson, Scottsdale, all of Ariz., assignors to Motorola Inc., Schamuburg, Ill.

Division of Ser. No. 762,751, Aug. 6, 1985, Pat. No. 4,870,467. This application Jul. 3, 1989, Ser. No. 375,236

Int. Cl.[4] H01L *3/00, 5/00, 29/90*

U.S. Cl. 437—15 **7 Claims**





1. A method of manufacturing a monolithic, temperature compensated voltage-reference diode in a body of semiconductor material having first and second major faces comprising the steps of:

forming a temperature compensation junction between semiconductor material of different conductivity types, said temperature compensation junction intersecting said first major face of said body and defining a portion of said body bounded by said temperature compensation junction and said first major face;

providing a region of varying resistivity in said portion of said body and having a first resistivity adjacent said temperature compensation junction and a second resistivity adjacent at least a portion of said first major face and an impurity concentration adjacent said temperature compensation junction on a side of said temperature compensation junction in said portion less than an impurity concentration in said body on the other side of said temperature compensation junction; and

forming a voltage reference junction between semiconductor material of different conductivity types near said first major face in said portion of said body.

4,886,763

DEVICE ISOLATION BY ETCHING TRENCH IN DIELECTRIC ON SUBSTRATE AND EPITAXIALLY FILLING THE TRENCH

Ken-ichi Suzuki, Tokyo, Japan, assignor to Oki Electric Industry Co., Ltd., Tokyo, Japan

Filed Aug. 18, 1988, Ser. No. 233,580

Claims priority, application Japan, Aug. 21, 1987, 62-206441

Int. Cl.[4] H01L *21/20, 21/76*

U.S. Cl. 437—61 **16 Claims**

1. A method of forming a semiconductor device having dielectric isolation regions, said method comprising the steps of:

(a) forming a first dielectric layer on a semiconductor substrate;

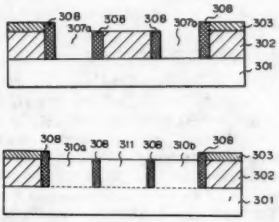
(b) forming a second dielectric layer on selected portions of said first dielectric layer so that a part of said first dielectric layer is exposed;

(c) forming a resist layer on selected portions of said second dielectric layer and on a part of the exposed portion of said first dielectric layer so that another part of said exposed part of said first dielectric layer is exposed;

(d) subjecting said exposed part of said first dielectric layer obtained in step (c) to reactive ion etching to expose a surface of said semiconductor substrate so that at least one first groove is formed in said first dielectric layer;

(e) removing said resist layer to expose said first and second dielectric layers;

(f) forming a third dielectric layer on the entire surface of the structure obtained in step (e);



(g) subjecting said third dielectric layer to reactive ion etching such that said third dielectric layer is left only on side walls of said first groove and of said second dielectric layer;

(h) subjecting the body obtained in step (g) to reactive ion etching to form at least one second groove in said first dielectric layer so that a surface of said substrate is exposed;

(i) epitaxially depositing a single crystal semiconductor material in said first and second grooves to a thickness which is substantially the same as the thickness of said first dielectric layer; and

(j) removing said third dielectric layer and portions of said second dielectric layer disposed on side walls of said third dielectric layer.

4,886,764

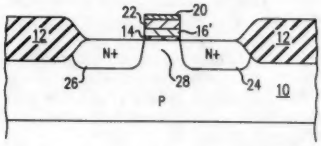
PROCESS FOR MAKING REFRACTORY METAL SILICIDE CAP FOR PROTECTING MULTI-LAYER POLYCIDE STRUCTURE

Robert O. Miller, The Colony, and Fu-Tai Liou, Carrollton, both of Tex., assignors to SGS-Thomson Microelectronics, Inc., Carrollton, Tex.

Continuation of Ser. No. 154,808, Feb. 11, 1988, abandoned. This application May 25, 1989, Ser. No. 357,666

Int. Cl.[4] H01L *21/283*

U.S. Cl. 437—200 **15 Claims**



1. A method for forming a conductive structure on a semiconductor substrate with a titanium silicide film, comprising:

forming a layer of polycrystalline silicon on the surface of the substrate;

forming a conformal layer of titanium over the polycrystalline silicon layer to a predetermined thickness;

forming a composite layer of refractory metal silicide over the layer of titanium, the thickness of the refractory metal silicide layer substantially thinner than the predetermined thickness of the titanium, the refractory metal silicide layer being more chemically stable and having a higher oxidation resistance than titanium silicide;

reacting the titanium with the polycrystalline silicon to consume a portion of polycrystalline silicon layer to form a layer of titanium silicide such that a remaining portion of the polycrystalline silicon layer underlying the original layer of titanium is left, the titanium silicide layer forming the primary conductive path; and

patterning and etching the substrate to define a polycide structure of polycrystalline silicon, titanium silicide and the refractory metal silicide.

4,886,765

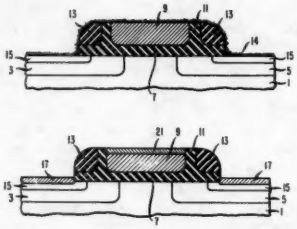
METHOD OF MAKING SILICIDES BY HEATING IN OXYGEN TO REMOVE CONTAMINATION

Min-Liang Chen, Lower Macungie Township; Chung W. Leung, South Whitehall Township; Chih-Yuan Lu, Lower Macungie Township, and Nun-Sian Tsai, South Whitehall Township, all of Pa., assignors to American Telephone and Telegraph Company, AT&T Bell Laboratories, Murray Hill, N.J.

Filed Oct. 26, 1988, Ser. No. 262,773

Int. Cl.[4] H01L *21/283, 21/316*

U.S. Cl. 437—200 **10 Claims**



1. A method of fabricating a semiconductor integrated circuit device, including the step of selectively removing from a body those portions of a dielectric layer disposed over a silicon substrate to expose portions of the substrate, including those where source/drain regions are to be formed characterized in the steps of:

performing the selective removal step in a manner which tends to leave contamination on at least one of the exposed portions of the substrate;

treating the body by heating in an atmosphere consisting essentially only of oxygen for a time and at a temperature sufficient to remove substantially all of the contamination left after the selective removal step to permit reliable subsequent silicide formation;

implanting a dopant into said substrate after said treating;

heating the body a second time in an atmosphere comprising a minority percentage oxygen to drive in said dopant, anneal ion implant damage, and further remove contamination;

etching off the silicon dioxide formed during said treating and heating steps; and

forming a metal silicide at the exposed portions of the substrate by depositing upon the exposed silicon portions a refractory metal and heating the body for a time and at a temperature sufficient to form a metal silicide.

4,886,766

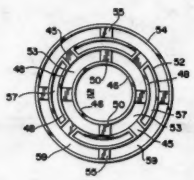
METHOD OF MAKING CERAMIC COMPOSITE ARTICLES AND ARTICLES MADE THEREBY

Ratnesh K. Dwivedi, Wilmington, Del., assignor to Lanxide Technology Company, LP, Newark, Del.

Filed Aug. 10, 1987, Ser. No. 84,550

Int. Cl.[4] C04B *35/52*

U.S. Cl. 501—87 **25 Claims**



1. A method for producing a self-supporting ceramic composite body comprising a plurality of axially aligned, spaced apart walls having a bounded cross-section, said ceramic composite body comprising (1) a ceramic matrix obtained by an oxidation reaction of a parent metal with an oxidant to form an oxidation reaction product, and (2) a filler embedded by said matrix, the method comprising the steps of:

(a) providing a shaped parent metal body having at least one open cavity to provide a wall with a bounded cross-section and opposed wall surfaces;

(b) juxtaposing at least one bedding of conformable filler material on said opposed wall surfaces, said at least one bedding of filler material being characterized by (1) being permeable to said oxidant when required for said oxidant to contact the molten parent metal in step (c) and being permeable to infiltration by growth of oxidation reaction product through the at least one bedding of filler material, and (2) retaining sufficient conformability to provide for accommodation of any melting-point volume change of said parent metal and any differential thermal expansion between said parent metal and the at least one bedding of filler material, wherein said at least one bedding of filler material comprises a support zone which is intrinsically self-bonding at a temperature above the melting point of the parent metal but below and sufficiently close to the temperature at which the molten parent metal reacts with said oxidant to form said oxidation reaction product, to permit said accommodation;

(c) heating said embedded shaped parent metal to a temperature above its melting point but below the melting point of said oxidation reaction product to form a body of molten parent metal and, at said temperature,

(1) reacting the molten parent metal with said oxidant to form said oxidation reaction product,

(2) maintaining at least a portion of said oxidation reaction product in contact with and between said body of molten metal and said oxidant, to progressively draw molten metal from said body of molten metal through the oxidation reaction product and into said at least one bedding of filler to concurrently form said plurality of axially aligned, spaced apart walls in said at least one bedding of filler as fresh oxidation reaction product continues to form at an interface between said oxidant and previously formed oxidation reaction product, and

(3) continuing said reaction for a time sufficient to at least partially embed the at least one bedding of filler material with said oxidation reaction product by growth of oxidation reaction product to form a self-supporting ceramic composite body having a plurality of axially aligned, spaced apart walls with a bounded cross-sec-

tion which inversely replicate in opposed directions the geometry of the shaped parent metal body thereby forming at least two axially aligned fluid passageways; and

(d) separating the resulting self-supporting composite body from any excess filler.

4,886,767

SILICON NITRIDE-CERAMIC AND A MANUFACTURING METHOD THEROF

Yasuhiro Goto, Urayasu; Takeyuki Yonezawa, Machida, and Yoshiyuki Ohnuma, Kawasaki, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Continuation-in-part of Ser. No. 117,544, Nov. 6, 1987, abandoned. This application Feb. 5, 1988, Ser. No. 152,716

Claims priority, application Japan, Nov. 21, 1986, 61-276638

Int. Cl.[4] C04B *35/58*

U.S. Cl. 501—97 **7 Claims**

1. A silicon nitride-ceramic composed of a sintered body including silicon nitride and 0.1 to 15 weight % of at least one additive, said ceramic having columnar crystals of β type silicon nitride oriented substantially in parallel to one plane, the ratio (I_{101}/I_{210}) of intensity (I_{101}) of plane (**101**) of the β type silicon nitride to intensity (I_{210}) of plane (**210**), determined by x-ray diffraction, being less than 0.4 with respect to the plane in which the columnar crystals are oriented, to improve mechanical properties of the ceramic with respect to said plane.

3. A method for manufacturing a silicon nitride-ceramic, comprising the steps of:

forming a raw material of mainly α type silicon nitride including 0.1 to 15 weight % of at least one additive and 5–50 weight % of needle-shaped crystals of β type silicon nitride; and

sintering the raw material at a temperature of approximately 1650° to 1850° C. to orient the β type silicon nitride approximately in parallel to one plane so that the ratio (I_{101}/I_{210}) of intensity (I_{101}) of plane (**101**) of the β type silicon nitride to intensity (I_{210}) of plane (**210**) thereof, determined by x-ray diffraction, is less than 0.4 with respect to the plane in which the needle-shaped crystals of the β type silicon nitride are oriented, thereby improving mechanical properties of the ceramic with respect to said plane.

4,886,768

TOUGHENED CERAMICS

Tseng-Ying Tien, Ann Arbor, Mich., assignor to Board of Regents Acting for and on Behalf of University of Michigan, Ann Arbor, Mich.

Filed Nov. 13, 1987, Ser. No. 120,600

Int. Cl.[4] C04B *35/48*

U.S. Cl. 501—104 **9 Claims**

1. A ceramic composition consisting essentially of: a major component consisting of ZrO_2 present at about 93 to 97.5 mole precent, a minor stabilizing component selected from the group consisting of Y_2O_3, MgO, Sc_2O_3, IN_2O_3 and rare earth oxides present at about 2 to about 4 mole percent; and a toughening agent selected from the group consisting of Ta_2O_5 and Nb_2O_5 present at about 0.5 to about 3 mole percent.

4,886,769

ACTIVE GAS ADSORBING ELEMENT AND METHOD OF MANUFACTURING

Tosimi Kuma, and Hiroshi Okano, both of Fukuoka, Japan, assignors to Kabushiki Kaisha Seibu Giken, Fukuoka, Japan

Filed Jun. 10, 1988, Ser. No. 205,274

Claims priority, application Japan, Jun. 10, 1987, 62-145873

Int. Cl.[4] B01J *29/04*

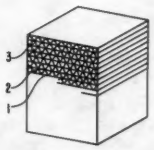
U.S. Cl. 502—62 **11 Claims**

7. A gas adsorbing element for adsorbing the active gas contained in an inactive gas, comprising:

a plurality of low density paper formed of inorganic fiber laminated to form a matrix;

small channels formed between the laminated low density papers, the channels extending to opposite surfaces;

a synthesized zeolite powder applied to the matrix; and



a metal silicate aerogel formed on the paper and in the apertures between fibers of said low density paper and combining with the synthesized zeolite.

9. A gas adsorbing element according to claim 7, wherein said low density paper substantially includes one of carbon fiber and active carbon fiber.

4,886,770

CATALYSTS FOR THE PREPARATION OF ELASTOMERIC OLEFINIC COPOLYMERS

Illaro Caffiani, Ferrara; Roberto Fabbri, Copparo; Gian F. Margelli, Occhiobello, and Umberto Zucchini, Ferrara, all of Italy, assignors to Ausimont, Milan, Italy

Filed Sep. 30, 1987, Ser. No. 103,176

Claims priority, application Italy, Oct. 2, 1986, 21872 A/86

Int. Cl.[4] C08F *4/64*

U.S. Cl. 502—104 **3 Claims**

1. Process for preparing catalytic components for the preparation of elastomeric copolymers of ethylene with alpha-olefins, or of ethylene with alpha-olefins and at least one diene, comprising reacting with one another:

(1) an anhydrous magnesium halide, or a compound having formula XMgOR, wherein X-OR, a halogen, or an R radical, and wherein R is an alkyl, cycloalkyl or aryl radical of from 1 to 20 C atoms;

(2) a compound having general formula $Me^n(O_x(OR)_y)$, or Me(acetyl-acetonate)^3, wherein:

Me=Ti or V;

R=an alkyl, aryl or cycloalkyl radical containing from 1 to 20 C atoms;

x=an integer larger than or equal to zero;

y=an integer larger than or equal to 2;

2x+y=the valance of Me;

n=an integer of from 1 to 6, inclusive;

(3) a halogenated compound capable of substituting a halogen atom for an OR group or R radical;

(4) an electron-donor compound selected from the group consisting of organic ethers, organic carboxylic acid esters, silicon or phosphorous-containing inorganic acid esters, silanes and siloxanes.

4,886,771

CATALYST FOR REGULATING THE MOLECULAR WEIGHT DISTRIBUTION OF ETHYLENE POLYMERS

Sun-Chueh Kao, Piscataway, and Frederick J. Karol, Belle Mead, both of N.J., assignors to Union Carbide Chemicals and Plastics Company Inc., Danbury, Conn.

Filed Jul. 1, 1988, Ser. No. 214,581

Int. Cl.[4] C08F *4/68*

U.S. Cl. 502—121 **18 Claims**

1. A solid catalyst precursor consisting essentially of:

(1) a solid, particulate, porous, inorganic carrier, as support for

(2) the reaction product of (a) a vanadium trihalide and (b) an electron donor,

(3) a boron halide or alkylaluminum modifier, and
(4) a phosphorus containing molecular weight distribution regulator having the formula

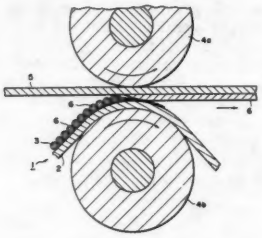
$R_3P=O$

wherein:
R is a monovalent hydrocarbon radical free of aliphatic unsaturation containing from 1 to 14 carbon atoms, or OR^1 wherein R^1 is a monovalent hydrocarbon radical free of aliphatic unsaturation containing from 1 to 14 atoms.

4,886,772
CATALYST TREATMENT PROCESS
Guillermo Prada-Silva; Jitendra A. Patel, both of Wappingers Falls, and Ajit K. Bhattacharya, Beacon, all of, assignors to Texaco Inc., White Plains, N.Y.
Division of Ser. No. 945,264, Dec. 22, 1986, Pat. No. 4,775,696. This application Jun. 20, 1988, Ser. No. 208,709
Int. Cl.[4] B01J 27/24
U.S. Cl. 502—200 16 Claims

1. A method for treating a sulfide-containing heavy metal catalyst effective for converting synthesis gas to alcohols, said catalyst comprising:
(1) at least one sulfided metal element selected from the group consisting of molybdenum, tungsten and rhenium,
(2) optionally a sulfided heavy metal element from the group consisting of cobalt, iron and nickel,
(3) A promoter comprising an alkali or alkaline earth element in free or combined form, and optionally
(4) a support,
the improvement which comprises treating said sulfided heavy metal element with an aqueous solution of a nitrogen-containing base, or a thermally stable derivative thereof at an elevated temperature to produce a reaction mixture, separating and drying said mixture and subjecting it to calcination.

4,886,773
IMAGE RECORDING SYSTEM
Shunichi Higashiyama, Nagoya, Japan, assignor to Brother Kogyo Kabushiki Kaisha, Aichi, Japan
Filed Mar. 21, 1988, Ser. No. 170,731
Claims priority, application Japan, Mar. 20, 1987, 62-66281; Mar. 20, 1987, 62-66282
Int. Cl.[4] B41M 5/22
U.S. Cl. 503—201 6 Claims



1. An image recording system for recording an image on an arbitrarily selected sheet-shaped member which comprises:
preparing a first capsule sheet coated with a plurality of microcapsules each of which envelopes therein a developing agent;
preparing a second capsule sheet coated with a plurality of microcapsules each of which envelopes therein a dye precursor and whose mechanical strength varies when exposed to light;
pressurising said sheet-shaped member and said first capsule sheet together in a superposed state so that said microcapsules coated on said first capsule sheet are ruptured and said developing agent enveloped therein is streamed out and transferred onto said sheet-shaped member;
exposing said second capsule sheet to vary the mechanical strength of microcapsules in accordance with said image to be recorded; and
pressurising said sheet-shaped member and said second capsule sheet together in a superposed state so that microcapsules on said second capsule sheet whose mechanical strength is low are ruptured and said dye precursors streamed out from the ruptured microcapsules react to said developing agent to develop a visible image on said sheet-shaped member.

4,886,774
ULTRAVIOLET PROTECTIVE OVERCOAT FOR APPLICATION TO HEAT SENSITIVE RECORD MATERIALS
Alfred Doi, 19471 Sierra Chula Rd., Irvine, Calif. 92715
Filed Aug. 9, 1988, Ser. No. 230,073
Int. Cl.[4] B41M 5/18
U.S. Cl. 503—226 21 Claims

1. An improved heat sensitive record material comprising:
a paperlike base sheet;
a thermally sensitive record layer formed upon at least one surface of said base sheet, said record layer being operative to form a visually discernable colored image in response to heat and wherein said colored image is subject to degradation as a result of exposure to ultraviolet radiation within a known photodegradative wavelength range; and
an ultraviolet cured/ultraviolet protective overcoat disposed over said thermally sensitive record material, said protective overcoat having been cured ultraviolet radiation at a wavelength outside of said known photodegradative wavelength range, and said cured overcoat containing at least one additive capable of preventing transmission therethrough of ultraviolet radiation within said known photodegradative wavelength range.

4,886,775
HEAT TRANSFER DYE-RECEIVING SHEET
Seiti Kubodera, and Nobuhiko Minagawa, both of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan
Filed Dec. 22, 1988, Ser. No. 288,170
Claims priority, application Japan, Dec. 24, 1987, 62-327978
Int. Cl.[4] B41M 5/035, 5/26
U.S. Cl. 503—227 10 Claims

1. A heat transfer dye-receiving sheet used in combination with a heat transfer sheet having a dye carrying layer containing a dye, said heat transfer dye-receiving sheet comprising a dye-receiving layer capable of receiving sheet comprising a support and a dye-receiving layer capable of receiving said dye transferred from said heat transfer sheet, wherein said dye-receiving layer contains a polyester resin comprising bisphenol A, carbonic acid and phthalic acid.

4,886,776
METHOD FOR MAKING MIRRORED SURFACES COMPRISING SUPERCONDUCTING MATERIAL
James T. Early, Livermore, and R. Steven Hargrove, Danville, both of Calif., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.
Filed May 29, 1987, Ser. No. 55,276
Int. Cl.[4] G02B 27/00
U.S. Cl. 505—1 4 Claims

1. A method for essentially perfect reflecting electromagnetic radiation of wavelength in the range of about 50 microns to 400 nm comprising the steps of adjusting the temperature of

a mirror surface, said surface consisting of a film of a multiple phase metal-metal oxide having superconducting properties at a temperature above about 40° K, to said temperature at which said oxide is superconducting, said surface characterized by an energy band gap greater than the photon energy of the reflected radiation at said adjusted temperature; and

directing said electromagnetic radiation to said surface to reflect said radiation from said surface..

4,886,777

PROCESS FOR PREPARING COMPOUND METAL OXIDES

Etsuji Kimura, Kasukabe; Nozomu Hasegawa, Omiya, and Yutaka Nishiyama, Kagawa, all of Japan, assignors to Mitsubishi Kinzoku Kabushiki Kaisha, Tokyo, Japan

Filed Aug. 1, 1988, Ser. No. 226,876

Claims priority, application Japan, Jul. 31, 1987, 62-190200

Int. Cl.[4] C01G *3/00*

U.S. Cl. 505—1 **9 Claims**

1. A process for preparing a compound metal oxide of a rare earth metal, an alkaline earth metal, and copper, comprising:

(i) adjusting the pH of an aqueous solution of (a) one member selected from the group consisting of a rare earth metal chloride, a rare earth metal nitrate, and a rare earth metal acetate, (b) one member selected from the group consisting of an alkaline earth metal chloride, an alkaline earth metal nitrate, and an alkaline earth metal acetate, and (c) one member selected from the group consisting of copper chloride, copper nitrate, and copper acetate to a pH of 6 to 9, to obtain a suspension of a fine precipitate of a rare earth metal hydroxide and copper hydroxide;

(ii) introducing carbon dioxide gas into said suspension, to obtain a fine homogeneous coprecipitate of an alkaline earth metal carbonate, a rare earth metal hydroxide, and copper hydroxide;

(iii) collecting said coprecipitate, to obtain a collected precipitate; and

(iv) firing said collected precipitate.

4,886,778

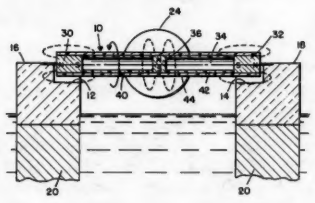
SUPERCONDUCTING ROTATING ASSEMBLY

Francis C. Moon, and Rishi Raj, both of Ithaca, N.Y., assignors to Cornell Research Foundation Inc., Ithaca, N.Y.

Filed Aug. 1, 1988, Ser. No. 227,066

Int. Cl.[4] F16C *39/06*

U.S. Cl. 505—1 **6 Claims**



1. A non-contacting, soft suspension, superconductive, rotating assembly comprising:

first and second bearing means comprised of material exhibiting Type II superconducting properties, each said bearing means formed as a recess in said superconducting material, said material not totally enclosing a portion of the circumference of an extremity of a member placed therein;

a rotatable member having two extremities aligned along a common axis, each extremity associated with a bearing means;

magnet means at each extremity, each magnet means having a polar axis which is colinear with said common axis of said rotatable member, each magnet means thereby presenting a single poleface to a bearing means;

means for maintaining each said bearing means at a temperature where said Type II superconducting properties are manifest; and

means for rotating said rotatable member, whereby each said magnet means is levitated and is adapted to rotate in a stable non-contacting position by repulsive fields generated by said associated bearing means.

4,886,779

INACTIVATION OF HUMAN IMMUNODEFICIENCY VIRUS (HIV) IN PROTEIN-CONTAINING SOLUTIONS BY PHENOLS

Joachim Hilfenhaus, Marburg, Fed. Rep. of Germany, assignor to Behringwerke Aktiengesellschaft, Marburg/Lahn, Fed. Rep. of Germany

Filed Mar. 10, 1988, Ser. No. 166,421

Claims priority, application Fed. Rep. of Germany, Mar. 12, 1987, 3707987

Int. Cl.[4] A61K *37/02*

U.S. Cl. 514—2 **8 Claims**

1. A process for the inactivation of human immunodeficiency virus (HIV) in protein solutions with minimal to no adverse effect on the biological activity of the protein solutions, which comprises addition of a phenol to a final concentration of less than about 1 g/100 ml in a protein solution, and allowing the phenol to act for up to 24 hours at a pH of 3.5–4.5.

5. A process for the inactivation of human immunodeficiency virus (HIV) in protein solutions with minimal to no adverse effect on the biological activity of the protein solutions, which comprises addition of a phenol to a final concentration of up to about 0.3 g/100 ml in a protein solution, and allowing the phenol to act for up to 24 hours.

4,886,780

CONJUGATES OF APOTRANSFERRIN PROTEINS WITH ANTI-TUMOR AGENTS

Ward P. Faulk, Apsley, Hasliberg/Goldern CH-6085, Switzerland

Continuation of Ser. No. 930,978, Nov. 13, 1986, which is a continuation of Ser. No. 719,275, Apr. 2, 1985. This application Jul. 12, 1988, Ser. No. 220,359

Int. Cl.[4] A61K *37/14, 39/385, 37/02;* **C07K** *15/14*

U.S. Cl. 514—8 **3 Claims**

1. A conjugate of apotransferrin conjugated to adriamycin by glutaraldehyde.

4,886,781

SUBSTITUTED 2,3-DIPHENYL-1,2-DIHYDROQUINOXALINES AND ANTIBIOTICS FOR GROWTHS PROMOTING

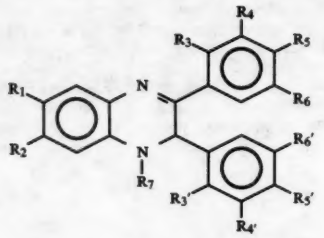
Kurt G. R. Sundelin, Wilmington, Del.; Joseph P. Salsnitro, Houston, Tex., and Susan Stackhouse, Hughson, Calif., assignors to International Minerals & Chemical Corp., Northbrook, Ill.

Division of Ser. No. 90,342, Aug. 27, 1987, Pat. No. 4,803,209. This application Oct. 21, 1988, Ser. No. 260,765

Int. Cl.[4] A61K *37/00, 31/70, 31/43, 31/495*

U.S. Cl. 514—11 **9 Claims**

1. A process for promoting growth of a meat-producing animal which comprises administering in combination to said animal (1) a growth-promoting amount of a compound of the formula



wherein R_1 and R_2 are independently selected from the group consisting of hydrogen, halogen, lower alkyl and lower alkoxy; R_3 and R_3' are independently selected from the group consisting of halogen, hydroxy, lower alkoxy, lower acyloxy and lower alkylcarbonyloxy, R_4, R_4', and R_5, R_5', R_6 and R_6' are independently selected from the groups consisting of hydrogen, halogen, hydroxy, lower alkyl, lower alkoxy and lower acyloxy; and R_7 is hydrogen or lower acyl; or a pharmaceutically acceptable salt thereof; and (2) a growth-promoting amount of bacitracin.

4,886,782

MALARIAL IMMUNOGEN

Michael A. Good, Rockville; Jay Berzofsky, Bethesda, and Louis H. Miller, Chevy Chase, all of Md., assignors to The United States of America as represented by the Department of Health and Human Services, Washington, D.C.

Filed Feb. 26, 1987, Ser. No. 19,000

Int. Cl.[4] A61K *39/12;* **C07K** *7/08, 7/10*

U.S. Cl. 514—12 **7 Claims**

1. A polypeptide consisting essentially of a T-cell epitope of the circumsporozoite protein of *P. falciparum*, said polypeptide having the following amino acid sequence in terms of single letter code: PSDKHIEQYLKKIKNSIS.

4,886,783

PENETRATION ENHANCERS FOR TRANSDERMAL DELIVERY OF SYSTEMIC AGENTS

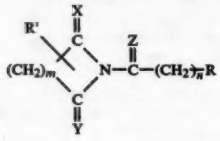
Gevork Minaskanian, Irvine, and James V. Peck, Costa Mesa, both of Calif., assignors to Nelson Research & Development Co., Irvine, Calif.

Continuation of Ser. No. 932,708, Nov. 19, 1986, abandoned, which is a continuation-in-part of Ser. No. 824,845, Jan. 31, 1986, abandoned. This application Aug. 17, 1988, Ser. No. 233,551

Int. Cl.[4] A61V *31/70*

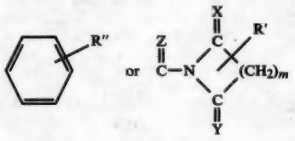
U.S. Cl. 574—29 **8 Claims**

1. In a method for enhancing the penetration of effective amounts of systemically active therapeutic agents through the skin or mucosal membranes of a humans or animals and into the bloodstream in a transdermal device or formulation, the improvement comprising the topical administration of a penetration enhancing amount of a membrane penetration enhancer having the structural formula



1

wherein each X, Y and Z may represent oxygen, sulfur or two hydrogen atoms, provided however that, when Z represents two hydrogen atoms, both X and Y represent oxygen or sulfur and when Z represents oxygen or sulfur at least one of X and Y must represent oxygen or sulfur; m is 2–6; R' is H or a lower alkyl group having 1–4 carbon atoms; n is 0–16 and R is $-CH_3$, and wherein the penetration enhancer penetrates into the bloodstream



wherein R'' is H or halogen.

4,886,784

NOVEL 23-IMINO DERIVATIVES OF 23-KETO COMPOUNDS

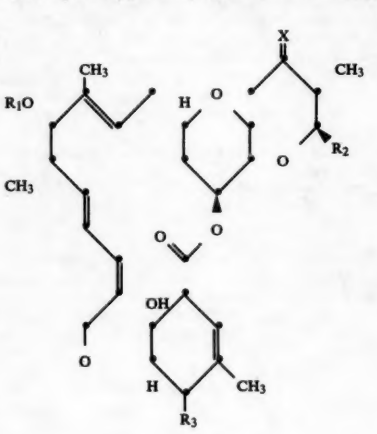
Goro Asato, Titusville, and Donald J. France, Pennington, both of N.J., assignors to American Cyanamid Company, Stamford, Conn.

Continuation-in-part of Ser. No. 907,188, Sep. 12, 1986, Pat. No. 4,849,446. This application Aug. 27, 1987, Ser. No. 88,954

Int. Cl.[4] A61K *31/365;* **C07D** *493/22*

U.S. Cl. 514—30 **8 Claims**

1. A compound represented by structural formula (I):

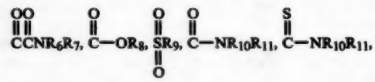


(I)

wherein,

R_1 is 4'-(α-L-oleandrosyl)-α-L-oleandrosyl or α-L-oleandrosyl;

R_2 is isopropyl or sec-butyl; R_3 is methoxy, hydroxy, acetoxy, methoxyacetoxy or chloroacetoxy; X is NOR_4 or $N—NHR_5$; R_4 is C_1–C_4 alkoxymethyl, CH_2COO-alkyl (C_1–C_4), N-(allyl)-carbamoyl, N-(propargyl)carbamoyl, phenylacetyl substituted on the phenyl ring with one or two halogens, C_1–C_4 alkyl groups, C_1–C_4 alkoxy groups or nitro groups, phenoxyacetyl optionally substituted on the phenyl ring by one or two halogens, C_1–C_4 alkyl groups, C_1–C_4 alkoxy groups or nitro groups, or benzoyl substituted with one or two halogens, C_1–C_4 alkyl groups, C_1–C_4 alkoxy groups or nitro groups; R_5 is



C_5–C_6 alkyl,

benzoyl optionally substituted with one or two halogens, C_1–C_4 alkyl groups, C_1–C_4 alkoxy groups or nitro groups; R_6 and R_7 are hydrogen, C_1–C_6 alkyl, or phenyl optionally substituted with one or two halogens, C_1–C_4 alkyl groups, C_1–C_4 alkoxy groups or nitro groups; R_8 is C_5–C_6 alkyl or phenyl optionally substituted with one or two halogens, C_1–C_4 alkyl groups, C_1–C_4 alkoxy groups or nitro groups; R_9 is C_1–C_6 alkyl or phenyl optionally substituted with one or two halogens, C_1–C_4 alkyl groups, C_1–C_4 alkoxy groups or nitro groups; R_{10} and R_{11} are hydrogen, C_5–C_6 alkyl or phenyl optionally substituted with one or two halogens, C_1–C_4 alkyl groups, C_1–C_4 alkoxy groups or nitro groups, with the proviso that both R_{10} and R_{11} are not hydrogen at the same time; or a pharmaceutically and pharmacologically acceptable salt thereof.

4,886,785

PYRIMIDINE DERIVATIVES, PHARMACEUTICAL COMPOSITIONS AND METHOD OF USING SAME

Robert W. Lambert, Welwyn; Joseph A. Martin, Harpenden, and Gareth J. Thomas, Welwyn, all of England, assignors to Hoffmann-La Roche Inc., Nutley, N.J.

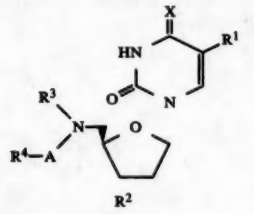
Filed Jul. 30, 1987, Ser. No. 79,730

Claims priority, application United Kingdom, Aug. 12, 1986, 8619630; May 7, 1987, 8710775

Int. Cl.[4] A61K *31/70*; C07H *17/00*

U.S. Cl. 514—50 18 Claims

16. A method for inhibiting herpes simplex virus type 2 (HSC-2) thymidine kinase in vitro which comprises administering an amount effective for inhibiting herpes simplex virus type 2 (HSV-2) thymidine kinase of a compound of the formula



I

wherein A is C_{1-8}-akylene, R^1 is halogen, C_{1-4}-alkyl or halo-(C_{1-4}-alkyl), R^2 is hydrogen, hydroxy C_{1-4}-alkanoyloxy, cyclopentylpropionyloxy, phenylacetoxy, benzoyloxy, R^3 is hydrogen or C_{1-4}-alkyl, R^4 is unsubstituted phenyl or phenyl carrying one or more substituents selected from the group consisting of halogen, hydroxy, C_{1-4}-alkyl, C_{1-4}-alkoxy, trifluoromethyl, nitro and phenyl or an unsubstituted phenyloxy or phenyloxy carrying one or more substituents selected from the group consisting of halogen, hydroxy, C_{1-4}-alkyl, C_{1-4}-alkoxy, trifluoromethyl, nitro and phenyl, and X is O or NH,

or a tautomer thereof.

4,886,786

ADDITIVE FOR IRRIGATION SOLUTION OR SURGICAL SOLUTION

Richard L. Lindstrom, 20050 Lakeview Ave., Excelsior, Minn. 55331, and Debra L. Skelnik, P.O. Box 344, Rt. 5, Cambridge, Minn. 55008

Continuation-in-part of Ser. No. 761,407, Aug. 1, 1985, Pat. No. 4,696,917, which is a continuation-in-part of Ser. No. 836,156, Mar. 4, 1986, Pat. No. 4,725,586. This application Feb. 2, 1988, Ser. No. 151,480

Int. Cl.[4] A61K *31/70*

U.S. Cl. 514—54 6 Claims

1. An aqueous supplementary concentrate for addition to Balanced Salt Solution for Ringer's Solution to form a surgical solution, the concentrate consisting essentially of effective amounts of:

a. water;

b. a glycosaminogycan;

c. an antioxidant;

d. dextrose or a pyruvate, or both;

e. an amino acid; and,

f. a bicarbonate buffer.

4,886,787

METHOD OF PREVENTING ADHESION BETWEEN BODY TISSUES, MEANS FOR PREVENTING SUCH ADHESION, AND PROCESS FOR PRODUCING SAID MEANS

Anthony N. de Belder, and Thomas Millson, both of Uppsala, Sweden, assignors to Pharmacia AB, Upsala, Sweden

PCT No. PCT/SE85/00282, § 371 Date Jan. 23, 1986, § 102(e) Date Jan. 23, 1986, PCT Pub. No. WO86/00912, PCT Pub. Date Feb. 13, 1986

PCT Filed Jul. 16, 1985, Ser. No. 847,171

Claims priority, application Sweden, Jul. 23, 1984, 8403817

Int. Cl.[4] A61K *31/70*; C07H *3/00*

U.S. Cl. 514—57 16 Claims

12. A method of preventing adhesions or accretions of body tissues in which one or more pieces of a gel of a crosslinked carboxylgroup-containing polysaccharide selected from the group consisting of carboxymethyl dextran, carboxymethyl starch, carboxymethyl cellulose and glucosaminoglycans, during the course of a surgical operation, is introduced into the interstices between the tissues to be maintained in a separated condition; the gel being formed by reacting said polysaccharide with a bi- or polyfunctional epoxide.

4,886,788

CYCLODEXTRIN CLATHRATES OF CARBACYCLIN DERIVATIVES AND THEIR USE AS MEDICINAL AGENTS

Werner Skuballa; Helmut Vorbrueggen; Helmut Dahl; Claus-Steffen Stuerzebecher, and Karl-Heinz Thierauch, all of Berlin, Fed. Rep. of Germany, assignors to Schering Aktiengesellschaft, Berlin and Bergkamen, Fed. Rep. of Germany

Filed Mar. 9, 1987, Ser. No. 23,506

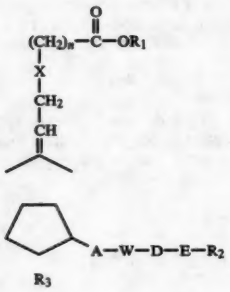
Claims priority, application Fed. Rep. of Germany, Mar. 7, 1986, 3608088

Int. Cl.[4] A61K *31/557*; C08B *37/16*; C07C *177/00*

U.S. Cl. 514—58 22 Claims

1. A pharmaceutical composition, comprising a cyclodextrin clathrate of a carbacyclin of the formula

(I)



wherein

R_1 is hydrogen, alkyl of 1–10 carbon atoms, alkenyl of 2–10 C-atoms, or C_{1-10} alkyl or C_{2-10} alkenyl substituted by C_{6-10}-aryl or C_{6-10} aryl substituted as defined for R_2 below,

A is a $—CH_2CH_2—$, trans-CH=CH—, or —C≡C-group,

W is —CHOR— or

wherein

the OR-group can be in the α- or β-position,

D is C_{1-10}-alkylene, C_{2-10}-alkenylene, or C_{1-10}-alkylene or C_{2-10}-alkenylene each substituted by fluorine

m is 1, 2 or 3,

E is —C≡C—, or $—CR_4=CR_5—$,

R_4 is hydrogen or alkyl of 1–5 carbon atoms,

R_5 is hydrogen, halogen, or alkyl of 1–5 carbon atoms,

R_2 is alkyl of 1–10 carbon atoms, alkenyl of 2–10 C-atoms, C_{1-10} alkyl or C_{2-10} alkenyl substituted by C_{6-10}-aryl or C_{6-10} aryl substituted as defined for R_2 below, cycloalkyl of 3–10 carbon atoms, C_{3-10}-cycloalkyl substituted by C_{1-4}-alkyl, aryl of 6–10 carbon atoms, C_{6-10}-aryl substituted by 1–3 halogen atoms, a phenyl group, 1–3 alkyl groups each of 1–4 carbon atoms, or a chloromethyl, fluoromethyl, trifluoromethyl, carboxy, C_1–C_4-alkoxy or hydroxy group or an aromatic heterocycle of 5- or 6-members containing 1 or 2 O, S, or N hetero atoms,

R_3 is OR,

n is 1, 2, 3, 4 or 5,

X is $—CH_2$ or an oxygen atom, and

R is H or C_{1-10}-acyl derived from a hydrocarbon aliphatic carboxylic acid, or is benzoyloxy, tetrahydropyranyloxy, tetrahydrofuranyloxy, trimethylsilyloxy, tribenzylsilyloxy, or dimethyl-tertbutylsilyloxy

and a pharmaceutically acceptable excipient.

19. A method of treating cardiac infarction or a peripheral arterial disease by administering an effective amount of a carbacyclin comprising administering the carbacyclin in the form of a cyclodextrin clathrate of claim **14**.

4,886,789

PERITONEAL DIALYSIS AND COMPOSITIONS FOR USE THEREIN

Jeremiah Milner, Roscrea, Ireland, assignor to M. L. Laboratories PLC, London, England

Continuation-in-part of Ser. No. 891,342, Jul. 31, 1986, abandoned, which is a continuation-in-part of Ser. No. 699,088, Feb. 7, 1985, abandoned, which is a continuation-in-part of Ser. No. 569,760, Jan. 10, 1984, abandoned. This application Apr. 10, 1989, Ser. No. 335,778

Claims priority, application United Kingdom, Jan. 12, 1983, 8300718; Feb. 18, 1984, 8404299

Int. Cl.[4] A61K *31/70*

U.S. Cl. 514—60 **14 Claims**

1. A method of effecting peritoneal dialysis which comprises introducing into the abdominal cavity of a patient an aqueous peritoneal dialysis composition comprising a water soluble glucose polymer mixture derived from the hydrolysis of starch containing at least 36.7% by weight of glucose polymers having a degree of polymerization (D.P.) of more than 12 glucose units.

4,886,790

NOVEL BIS(2,2-DIMETHYL-1-AZIRIDINYL) PHOSPHINIC AMIDES FOR USE IN THE TREATMENT OF TUMORS

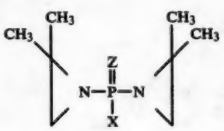
Thomas J. Bardos, Snyder, N.Y.; Michael E. Perlman, Durham, N.C., and Joan E. MacDiarmid, Amherst, N.Y., assignors to The Research Foundation of State University of New York, Albany, N.Y.

Division of Ser. No. 779,147, Sep. 23, 1985, abandoned, which is a continuation-in-part of Ser. No. 484,213, Apr. 12, 1983, abandoned, which is a continuation-in-part of Ser. No. 367,338, Apr. 12, 1982, abandoned. This application Mar. 2, 1988, Ser. No. 163,283

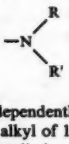
Int. Cl.[4] A61K *31/675*; C07D *203/06*

U.S. Cl. 514—83 **18 Claims**

1. A method for inhibiting the replication of solid skin cancer tumor cells which comprises administering to said tumor cells an effective tumor cell inhibiting concentration of a compound of the formula:



wherein X is



wherein R and R′ are independently hydrogeh, alkyl of 1–6 carbon atoms, substituted alkyl of 1–10 carbon atoms, phenyl or substituted phenyl, Y is alkyl or substituted alkyl of 1–10 carbon atoms wherein the substituents on the substituted moieties are selected from halogen, hydroxy, lower alkoxy, nitro, amine and sulfonate, and, Z is oxygen or sulfur.

4,886,791

SOLUBLE DERIVATIVES OF SILYBIN, A METHOD OF PREPARING THEM, AND PHARMACEUTICAL COMPOSITIONS CONTAINING THEM

Raffaello Giorgi; Marisa Conti, and Giorgio Pifferi, all of Milan, Italy, assignors to Inverni della Beffa S.p.A., Milan, Italy

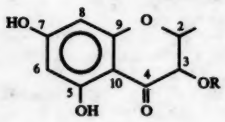
Filed Jul. 13, 1988, Ser. No. 219,058

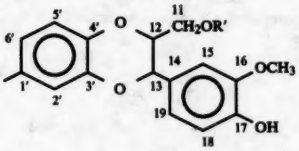
Claims priority, application United Kingdom, Jul. 17, 1987, 8716918

Int. Cl.[4] A61K *31/335;* C07D *319/20*

U.S. Cl. 514—100 5 Claims

1. A compound of the general formula I





wherein R=H or $PO(OH)_2$ and R'=$PO(OH)_2$ or a pharmaceutically acceptable salt thereof.

4,886,792

10-DIHYDRO-10-DEOXO-11-AZAERYTHRONOLIDE A COMPOUNDS, METHODS AND INTERMEDIATES FOR THE MANUFACTURE THEREOF AND THEIR USE IN PHARMACEUTICALS AND IN THE MANUFACTURE THEREOF

Slobodan Djoki; Nevenka Lopotar; Gabrijela Kobrehel; Hrvoje Krnjevi, and Olga Carevi , all of Zagreb, Yugoslavia, assignors to Sour Pliva, Yugoslavia

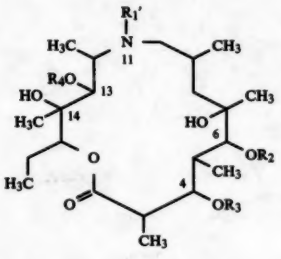
Filed Apr. 12, 1988, Ser. No. 180,491

Claims priority, application Yugoslavia, Sep. 3, 1987, 1631/87; Jan. 18, 1988, 85/88

Int. Cl.[4] A61K *31/395;* C07D *273/01*

U.S. Cl. 514—183 26 Claims

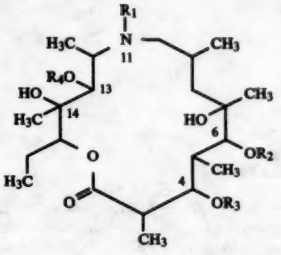
1. 10-dihydro-10-deoxo-11-azaerythronolide A compounds of the formula (IA)



(IA)

wherein R_1' stands for a lower alkyl group or a lower alkanoyl group, R_2, R_3 and R_4 have identical or different meanings and each stands for a hydrogen atom or a lower alkanoyl group, and their pharmaceutically acceptable acid addition salts.

26. The method of treating inflammations in humans and animals which comprises administering a pharmaceutically and anti-inflammatory effective amount of a compound of the formula (I)



(I)

wherein R_1 stands for a hydrogen atom, a lower alkyl group or a lower alkanoyl group, R_2, R_3, and R_4 have identical or different meanings and each stands for a hydrogen atom or a lower alkanoyl group, and optionally pharmaceutically acceptable acid addition salts thereof.

4,886,793

PENEM DERIVATIVES

Ettore Perrone; Marco Alpegiani; Angelo Bedeschi, all of Milan; Franco Zarini, Settimo Milanese; Costantino Della Bruna, Rho, and Giovanni Franceschi, Milan, all of Italy, assignors to Farmitalia Carlo Erba, S.r.l., Milan, Italy

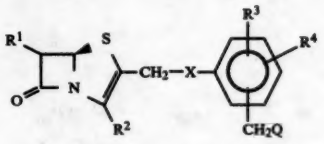
Filed Mar. 5, 1987, Ser. No. 22,247

Claims priority, application United Kingdom, Mar. 6, 1986, 8605549

Int. Cl.[4] C07D *499/00;* A61K *31/425*

U.S. Cl. 514—192 13 Claims

1. A compound of the following formula I:



(I)

wherein

R^1 is hydrogen or a C_1–C_4 alkyl group either unsubstituted or substituted by one or more substituents chosen from a free or protected hydroxy or halogen atom;

R^2 is a free or esterified carboxy group or carboxylate anion;

R^3 and R^4 are each independently either hydrogen or

(a) a C_1–C_6 alkyl group, or R^3 and R^4 are two ortho alkyl groups linked to form a di- to decamethylene ring or a decamethylene ring in which one ring C atom is replaced by N, O or S, or said decamethylene ring containing one or two double bonds, or

(b) a C_2–C_6 alkenyl group, or

(c) a C_2–C_6 alkynyl group, or

(d) a C_1–C_6 alkylsulphinyl group or alkylsulphonyl group, or

(e) a C_1–C_6 alkanoyl group, or

(f) halogen, —CF_3, —CN, —CHO, or —$CONH_2$, or

(g) OR, SR or NHR, wherein R represents hydrogen atom or a C_1–C_6 alkyl or C_1–C_6 alkanoyl group;

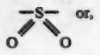
X is either

(a') an oxygen atom, or

(b') a sulphinyl group

or

(c') a sulphonyl group



or,

(d') a sulphur atom;

Q is either

(a'') free or protected hydroxy, or

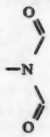
(b'') a C_1–C_4 acyloxy, or

(c'') carbamoyloxy $OCONH_2$, or

(d'') a

heterocyclythio group wherein the heterocyclic moiety of the heterocyclic thio group is a saturated or unsaturated, monocyclic or bicyclic ring, containing from 1 to 5 heteroatoms selected from oxygen, nitrogen and sulphur, or

(e'') an imido group which is a five or six-membered cyclic imido group having the structural formula



or said structural formula incorporating, in addition to the imido nitrogen, one or two heteroatoms selected from nitrogen, oxygen and sulphur, or said cyclic imido group fused with a benzene or pyridine ring, or

(f'') a quaternary ammonium group the quaternary ammonium group being of the formula

wherein

(1) R^5, R^6, R^7 are each independently an alkyl, aralkyl or aryl radical; or

(2) R^5 is as defined above under (1) and R^6, R^7 taken together with the nitrogen atom represent a heterocyclic radical, or such radical fused with one phenyl ring or with a 5–7 membered, saturated or unsaturated cycloaliphatic or heterocyclic ring; or

(3) R^5, R^6, R^7, taken together with the nitrogen atom, represent an azoniabicyclo or azoniotricyclo radical; or

(4) R^5, R^6, R^7 taken together with the nitrogen atom, represent a pyridinium, pyrazolium, pirazinium, or pyridazinium radical, or such radical fused with one phenyl ring or with a 5–7 membered, saturated or unsaturated cycloaliphatic or heterocyclic ring, or

(g'') a halogen atom,

or such groups R^3, R^4, X and Q in which the alkyl, alkenyl, alkynyl, cycloalkyl, alkylamino, alkoxy, alkylthio, alkylsulphinyl, alkylsulphonyl, alkanoyl groups under (a)–(g), the heterocyclythio group under (d'') the imido group under (e''), and the R^5, R^6, R^7 radicals of the ammonium group as defined above, are independently substituted by a substituent selected from the class consisting of (a''') halogen, (b''') hydroxy, (c''') C_1–C_4 alkoxy, (d''') C_1–C_4 alkylthio, (e) amino, or amino mono- or disubstituted with C_1–C_4 alkyl groups, (f''') sulfo, (g''') free or esterified carboxy, ((h''') —$CONH_2$ or CN, (k''') carbamoyloxy, or hydroxycarbamoyl (l''') hydroxyiminomethyl (HO—N=CH), α-methylhydroxyiminomethyl (HO—N=C(CH_3)—) or methoxyiminomethyl (CH_3—O—N=CH—), (m''') formamido or acetamido, (n''') formyloxy or acetoxy, (o''') C_1–C_6 alkanoyl group, (p''') nitro, (q''') C_1–C_4 alkyl group either unsubstituted or substituted by a substituent chosen from (a''') to (p''') above,

and the pharmaceutically or veterinarily acceptable salts thereof.

4,886,794

4-[(α,α-DIARYL)-HYDROXYMETHYL]-1-PIPERIDINYLALKYL-CYCLIC CARBAMATE DERIVATIVES AS ALLERGIC RESPONSE INHIBITORS

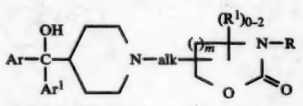
David A. Walsh, Richmond, Va., assignor to A. H. Robins Company, Incorporated, Richmond, Va.

Continuation-in-part of Ser. No. 46,743, May 7, 1987, abandoned. This application Jun. 3, 1988, Ser. No. 202,028

Int. Cl.[4] A61K *31/33*; C07D *413/00, 275/04, 277/04*

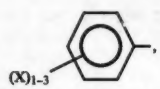
U.S. Cl. 514—211 **60 Claims**

1. A cyclic carbamate derivative, substituted on one of the ring carbon atoms by a 4-[(bis-aryl)-hydroxymethyl]-1-piperidinalkyl radical, selected from a group having the formula:

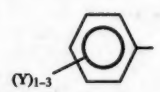


wherein

R is selected from hydrogen, loweralkyl, cycloalkyl having 3–9 carbon atoms, phenyl,

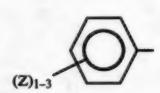


phenyl-loweralkyl or



loweralkyl;

Ar and Ar^1 are selected from phenyl,



or 2,3 or 4 pyridinyl radicals;

"alk" is a straight or branched hydrocarbon chain containing 1–8 carbon atoms;

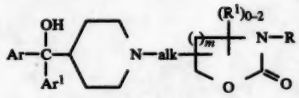
R^1 is loweralkyl substituted for hydrogen on a ring carbon;

m is 1 to 4;

X, Y and Z are selected from halogen, loweralkyl, loweralkoxy or trifluoromethyl and when more than 1, may be the same or different;

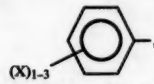
optical isomers thereof, or a pharmaceutically acceptable acid addition salt thereof.

16. A method of inhibiting Type 1 allergic response in a living animal which comprises administering to said animal in need thereof an effective amount of a compound selected from the group having the formula:

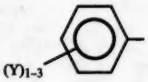


wherein;

R is selected from hydrogen, loweralkyl, cycloalkyl having 3–9 carbon atoms, phenyl,

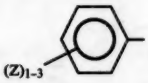


phenyl-loweralkyl or



loweralkyl;

Ar and Ar^1 are selected from phenyl,



or 2,3 or 4 pyridinyl radicals;

"alk" is a straight or branched hydrocarbon chain containing 1–8 carbons;

R^1 is loweralkyl substituted for hydrogen on a ring carbon;

m is 1 to 4;

X, Y and Z are selected from halogen, loweralkyl, loweralkoxy or trifluoromethyl and when more than one, may be the same or different;

optical isomers thereof or a pharmaceutically acceptable acid addition salt thereof.

4,886,795

TREATMENT AND PREVENTION OF RETINAL EDEMA WITH DOPAMINERGIC ANTAGONISTS

Ronald A. Schachar, P.O. Box 145, Denison, Tex. 75020

Continuation-in-part of Ser. No. 725,101, Apr. 19, 1985, Pat. No. 4,624,957, which is a continuation-in-part of Ser. No. 622,495, Jun. 20, 1984, abandoned. This application Oct. 24, 1986, Ser. No. 922,924

Int. Cl.[4] A61K *31/55, 31/54, 31/38, 31/445*

U.S. Cl. 514—211 **17 Claims**

1. A method of preventing retinal edema due to accumulated fluid leaking from capillary vessels comprising administering to a patient in need thereof a dopaminergic antagonist selected from the group consisting of phenothiazine derivatives, thioxanthines, and dibenzoxazepines, in an amount which is effective in preventing said edema.

4,886,796

IMMUNOREGULATION

Ronald D. Eichner, Wanniassa, and Arno Mullbacher, Curtin, both of Australia, assignors to Australian National University, Acton, Australia

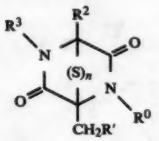
Division of Ser. No. 733,316, May 13, 1985, Pat. No. 4,727,018. This application Nov. 9, 1987, Ser. No. 117,944

Claims priority, application Australia, May 18, 1984, PG5053

Int. Cl.[4] A61K *31/55, 31/50*

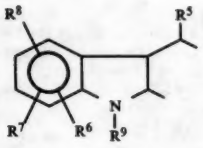
U.S. Cl. 514—211 **4 Claims**

1. A method of suppressing the immune response of a human or other animal in need of such suppression comprising the administration to said human or other animal an effective amount of a compound of the general formula (1):



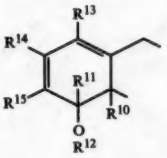
(1)

wherein R^o and R^1 are radicals selected from the group consisting of hydrogen, hydroxy, alkyl, alkoxy and acyloxy; R^2 and R^3 are radicals separately selected from the group consisting of hydrogen and alkyl; or together, represent a radical of the general formula (2):



(2)

wherein R^5, R^6, R^7, R^8 and R^9 are radicals separately selected from the group consisting of hydrogen, alkyl, hydroxy, alkoxy, sulfate, and halogen; or R^2 and R^3 together, represent a radical of the general formula (3):



(3)

wherein R^{10} and R^{11} both hydrogen; or together, represent a valence bond; R^{12}, R^{13}, R^{14}, R^{15} are radicals selected from the group consisting of hydrogen, hydroxy, alkoxy, sulfate and acyloxy; and n is an integer selected from the range 2 to 4; alone or in association with one or more pharmaceutically acceptable carriers or diluents.

4,886,797

HETEROCYCLIC COMPOUNDS AND THEIR PREPARATION AND USE

Frank Wätjen, and Mogens Engelstoft, both of Vaerloese, Denmark, assignors to A/S Ferrosan, Soeborg, Denmark

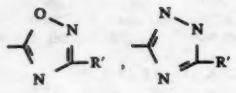
Division of Ser. No. 912,777, Sep. 26, 1986. This application Feb. 2, 1989, Ser. No. 305,969

Claims priority, application Denmark, Oct. 17, 1985, 4768/85

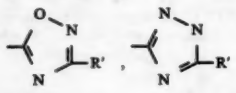
Int. Cl.[4] C07D *487/04;* **A61K** *31/555*

U.S. Cl. 514—220 **6 Claims**

1. Heterocyclic compounds having the formula I



wherein
X is



or CO_2R'
wherein R' is C_{1-6}-alkyl, C_{3-7}-cycloalkyl, or C_{1-3}-alkoxymethyl, and
—A— is $-(CH_2)_n-Y-(CH_2)_m-$,
wherein n and m are 1 and —Y— is —NR"—, wherein R" is hydrogen or C_{1-6}-alkyl.

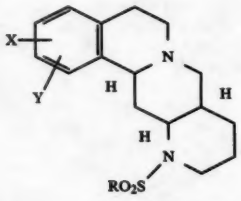
4,886,798

OPTICAL ISOMERS OF SULFONYLDECAHYDRO-8H-ISOQUINO-(2,1-G)(1,6) NAPHTHYRIDINES AND RELATED COMPOUNDS USEFUL AS α_2-BLOCKERS

Robin D. Clark, Palo Alto, Calif., assignor to Syntex (U.S.A.) Inc., Palo Alto, Calif.

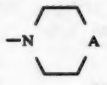
Continuation-in-part of Ser. No. 37,320, Apr. 13, 1987, abandoned. This application Mar. 29, 1988, Ser. No. 174,750
The portion of the term of this patent subsequent to Dec. 13, 2005, has been disclaimed.
Int. Cl.[4] A61K *31/47;* **C07D** *455/03*
U.S. Cl. 514—233.2 **21 Claims**

1. A compound of the formula (1):



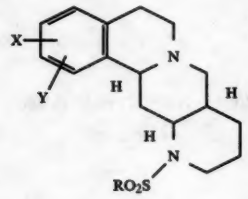
(1)

in which:
X and Y are independently hydrogen, hydroxy, lower alkyl of one to six carbon atoms, lower alkoxy of one to six carbon atoms or halo, or X and Y taken together is methylenedioxy or ethylene-1,2-dioxy; and
R is lower alkyl of one to six carbon atoms, phenyl optionally substituted by one or two substituents chosen from halo or amino groups or lower alkyl or lower alkoxy groups of one to four carbon atoms, $-(CH_2)_mOR^1$ or $-NR^1R^2$ wherein m is an integer of 1 to 6 and R^1 and R^2 are independently hydrogen or lower alkyl, or $-NR^1R^2$ taken together is a heterocycle of the formula:



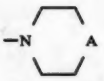
wherein A is $-CH_2-$, $-NR^1-$ or oxygen; or a pharmaceutically acceptable salt thereof.

19. A method for treating a mammal having a disease-state which is treatable with an α_2-blocker, which comprises administering a therapeutically effective amount of a compound of the formula



(I)

in which:
X and Y are independently hydrogen, hydroxy, lower alkyl of one to six carbon atoms, lower alkoxy of one to six carbon atoms or halo, or X and Y taken together is methylenedioxy or ethylene-1,2-dioxy; and
R is lower alkyl of one to six carbon atoms, phenyl optionally substituted by one or two substituents chosen from halo or amino groups or lower alkyl or lower alkoxy groups of one to four carbon atoms, $-(CH_2)_mOR^1$ or $-NR^1R^2$ wherein m is an integer of 1 to 6 and R^1 and R^2 are independently hydrogen or lower alkyl, or $-NR^1R^2$ taken together is a heterocycle of the formula:



wherein A is $-CH_2-$, $-NR^1-$ or oxygen; or a pharmaceutically acceptable salt thereof.

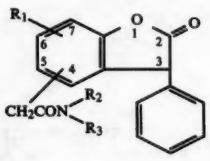
4,886,799

ACETAMIDES DERIVED FROM 2,3-DIHYDRO-3-PHENYL-2-BENZOFURANONE

Gilbert Lavielle, La Celle Saint-Cloud, and Jean Lepagnol, Chatou, both of France, assignors to Adir Et Cie, Neuilly-sur-Seine, France

Division of Ser. No. 155,353, Feb. 12, 1988, Pat. No. 4,812,469. This application Sep. 14, 1988, Ser. No. 244,132
Int. Cl.[4] A61K *27/00;* **C07D** *413/00, 401/00/405/00*
U.S. Cl. 514—233.5 **8 Claims**

1. A compound of formula I



(I)

in which:
either R_1 is at the 7-position and the acetamido group is at the 5-position, or R_1 is at the 5-position and the acetamido group is at the 7-position,
R_1 is a hydrogen or halogen atom,
R_2 and R_3 form, together with the nitrogen to which they are attached, a 4-morpholinyl radical or a 1-piperazinyl radical (optionally substituted at the 4-position with an alkyl radical having 1 to 4 carbon atoms, or with a benzyl radical optionally substituted with an alkyl radical having 1 to 4 carbon atoms or a 3,4-methylenedioxy radical, or a 2-pyridyl radical optionally substituted with an alkyl radi-

cal having 1 to 4 carbon atoms or with a trifluoromethyl radical),

or an addition salt thereof with a pharmaceutically-acceptable inorganic or organic acid.

3. A method of treating a disease linked to hypoxemia and to energy insufficiency or cerebral aging in a subject suffering therefrom comprising the step of administering to the said subject an amount of a compound of claim 1 which is effective for the alleviation of such disease.

4,886,800

SUBSTITUTED CINNOLINE DERIVATIVES AS CNS DEPRESSANTS

James F. Resch, Wilmington, Del., assignor to ICI Americas Inc., Wilmington, Del.

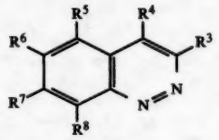
Filed May 29, 1986, Ser. No. 868,791

Claims priority, application United Kingdom, May 30, 1985, 85/13639

Int. Cl.[4] A61K *31/535, 31/50;* **C07D** *413/12, 237/28*

U.S. Cl. 514—234.5 **9 Claims**

1. A compound of formula I



I

wherein

R^3 is selected from a group consisting of an amide of formula $CONRR^9$ and a ketone of formula $COCRR^{10}R^{11}$;

R^4 is selected from a group consisting of $—NR^{12}R^{13}$ and OH;

R^5, R^6 and R^7 are each independently selected from a group consisting of hydrogen, (1–5C)alkyl, chloro and methoxy;

R^8 is selected from a group consisting of (1–5C)alkyl, (2–4C-)alkenyl, (2–5C)alkenyl, (3–6C)cycloalkyl, (4–7C)cycloalkylalkyl, phenylmethyl, and (1–4C)hydroxyalkyl;

R and R^9 are each independently selected from a group consisting of hydrogen (provided that R and R^9 cannot both be hydrogen at the same time), (1–4C)alkyl, (3–4C-)alkenyl, (3–4C)alkenyl, (4–5C)cycloalkylalkyl, (2–4C)-fluor alkyl having 1–4 fluoros provided that no fluorine is on a carbon bonded to nitrogen, 4, 5-dihydrothiazol-2-yl, phenylmethyl, or R and R^9, when taken together, form a (4–5C)alkylene in which one of the carbons may optionally be replaced by an oxygen, or, when taken together, form a 4 carbon alkenylene;

R^{10} and R^{11} are each hydrogen;

R^{12} and R^{13} are each independently selected from a group consisting of hydrogen, (1–4C)alkyl, (4–6C)cycloalkylalkyl and (2–4C)acyl;

or a pharmaceutically acceptable salt thereof.

4,886,801

DIAZINE-ETHENYLPHENYL OXAMIC ACIDS AND ESTERS AND SALTS THEREOF

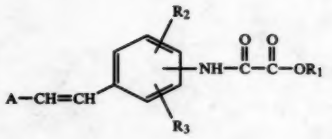
Karl G. Grozinger, Ridgefield, and James T. Oliver, Middlebury, both of Conn., assignors to Boehringer Ingelheim Pharmaceuticals Inc., Ridgefield, Conn.

Division of Ser. No. 43,018, Apr. 27, 1987, Pat. No. 4,788,198, which is a division of Ser. No. 733,007, May 10, 1985, Pat. No. 4,681,884, and a continuation-in-part of Ser. No. 528,522, Sep. 1, 1983, abandoned. This application Sep. 12, 1988, Ser. No. 243,549

Int. Cl.[4] C07D *237/02;* **A61K** *31/50*

U.S. Cl. 514—247 **9 Claims**

1. A compound of the formula



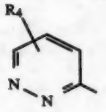
wherein

R_1 is hydrogen or alkyl of 1 to 4 carbon atoms;

R_2 is hydrogen, methyl, hydroxyl, alkoxy of 1 to 4 carbon atoms, di(alkyl of 1 to 2 carbon atoms)amino-(alkoxy of 1 to 4 carbon atoms) or halogen;

R_3 is hydrogen or $NHCOCOOR_1$;

A is



R_4 is hydrogen, methyl, alkoxy of 1 to 4 carbon atoms, hydroxyl, amino, alkanoyloxy of 1 to 2 carbon atoms, di(alkyl of 1 to 2 carbon atoms)-amino-(alkoxy of 1 to 4 carbon atoms) or acetamido; and

R_5 is hydrogen, amino, alkoxy of 1 to 4 carbon atoms, halogen or $NHCOCOOR_1$: or, when R_1 is hydrogen, a nontoxic, pharmaceutically acceptable salt thereof.

8. A method of treating an allergic disorder in a mammal in need thereof, which comprises administering an effective amount of a compound of claims 1 or 2 to said mammal.

9. A method of treating an inflammatory disorder in a mammal in need thereof, which comprises administering an effective amount of a compound of claims 1 or 2 to said mammal.

4,886,802

17-AZA-20,21, DINOREBURNAMENINES

Nurgün Aktogu, Robinson, and Francois Clemence, Paris, both of France, assignors to Roussel Uclaf, Paris, France

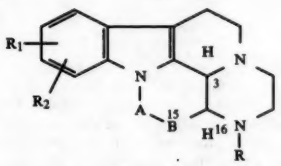
Filed Apr. 14, 1988, Ser. No. 181,657

Claims priority, application France, Apr. 15, 1987, 87 05361

Int. Cl.[4] C07D *487/22, 487/14, 403/06;* **A61K** *31/495*

U.S. Cl. 514—250 **15 Claims**

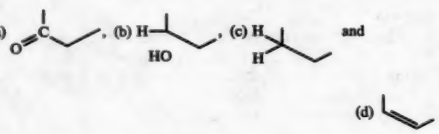
1. A compound selected from the group consisting of all possible isomeric forms, optically active isomers and racemic mixtures of compounds of the formula



(I)

wherein R_1 and R_2 are individually selected from the group consisting of hydrogen, halogen, alkyl and alkoxy of 1 to 5 carbon atoms, —OH, $—CF_3$ and $—NO_2$, R is selected from the group consisting of hydrogen, alkyl of 1 to 5 carbon atoms, aralkyl of 7 to 12 carbon atoms, benzoyl and acyl of an alkanoic acid of 1 to 12 alkyl carbon atoms and

is selected from the group consisting of



and their non-toxic, pharmaceutically acceptable acid addition salts.

11. The method of relieving pain in warm-blooded animals comprising administering to warm-blooded animals an analgesically effective amount of at least one compound of claim 1.

4,886,803

BENZIMIDAZOLE DERIVATIVES

Noriyoshi Sueda, Saitama; Yoshikuni Suzuki, Omiya; Toshiji Sugai, Saitama; Hiroaki Yamada, and Makoto Yanai, both of Kawagoe, all of Japan, assignors to Nisshin Flour Milling Co., Ltd., Japan

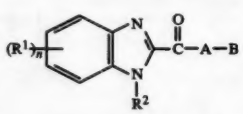
Filed Jul. 15, 1987, Ser. No. 73,738

Claims priority, application Japan, Jul. 25, 1986, 61-173759; Jul. 10, 1987, 62-171139

Int. Cl.[4] A61K *31/505;* C07D *403/14*

U.S. Cl. 514—252 14 Claims

1. A compound of Formula I

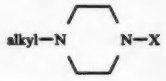


(I)

wherein R^1 is a hydrogen atom, a (C_1–C_3) alkyl group, a (C_1–C_3) alkoxy group or a halogen atom;

n is 1 to 4;

R^2 is a hydrogen atom, a (C_1–C_4) alkyl group, an amino (C_2–C_3) alkyl group, a mono- or di- (C_1–C_3) alkyl-amino (C_2–C_3) alkyl group, acetyl, propionyl, butyryl, stearoyl, benzyl, phenethyl, a carboxy (C_1–C_3) alkyl group, a (C_1–C_3) alkoxy carbonyl (C_1–C_3) alkyl group or (C_2–C_4)



wherein X is a (C_1–C_3) alkoxy phenyl group benzyl, a (C_1–C_3) alkoxybenzoyl or furoyl group;

A is —NR^3— where R^3 is hydrogen or (C_1–C_3) alkyl, a (C_1–C_4) alkylene or a (C_2–C_4) alkyldiene; and

B is a heterocylic group selected from triazolyl, pyridyl, pyridazinyl pyrimidinyl, pyrazinyl, benzimidozolyl, benzothiazolyl, quinolyl and isoquinolyl, said heterocyclic group being optionally substituted by one or more (C_1–C_3) alkyl, (C_1–C_3) alkoxy, nitro or phenyl groups, or the physiologically acceptable acid addition salts thereof.

8. A pharmaceutical composition which comprises as an active ingredient an effective amount of a compound of claim 1 or the physiologically acceptable acid addition salt thereof, optionally in admixture with additives for pharmaceutical preparations.

4,886,804

CIRCULATION-ACTIVE DIHYDROPYRIDINE ETHERS

Gerhard Franckowiak; Martin Bechem; Rainer Gross, all of Wuppertal; Siegfried Hebisch, Oberhausen, and Matthias Schramm, Cologne, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

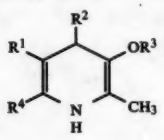
Filed Sep. 20, 1988, Ser. No. 249,391

Claims priority, application Fed. Rep. of Germany, Sep. 25, 1987, 37323806

Int. Cl.[4] A61K *31/50;* C07D *237/04*

U.S. Cl. 514—252 12 Claims

1. A dihydropyridine ether of the formula

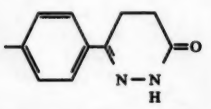


(I)

in which

R^1 - stands for cyano, nitro or for a —$COOR^5$ group, wherein

R^5 - denotes straight-chain or branched alkyl having up to 6 carbon atoms, which can be interrupted by an oxygen in the chain and which can be monosubstituted or polysubstituted by identical or different substituents from the group consisting of halogen, cyano, hydroxyl, phenyl, phenoxy and



R^2 - stands for aryl having 6 to 12 carbon atoms, which can be monosubstituted, disubstituted or trisubstituted by identical or different substituents from the group consisting of halogen, cyano, nitro, trifluoromethyl, trifluoromethoxy, trifluoromethylthio, alkyl having up to 4 carbon atoms or alkoxy having up to 4 carbon atoms,

R^3 - stands for aryl having 6 to 12 carbon atoms, or stands for straight-chain, branched or cyclic alkyl having up to 6 carbon atoms and

R^4 - stands for straight-chain alkyl having up to 4 carbon atoms or for amino or a physiologically acceptable salt thereof.

4,886,805

NOVEL AMINOALKYLTHIO DERIVATIVES OF TRIAZOLOPYRIDINE OR TRIAZOLOQUINOLINE, THE PROCESSES FOR THEIR PREPARATION, AND DRUGS, USEFUL ESPECIALLY AS ANALGESICS, IN WHICH THEY ARE PRESENT

Nicole Bru-Magniez, Paris; Jean-Marie Teulon, La Celle Saint Cloud, and Michèle Launay, Rueil-Malmaison, all of France, assignors to Centre D'Activite Et De Recherches Pharmaceutique Industrielle Biologique Medicale, Rueil-Malmaison, France

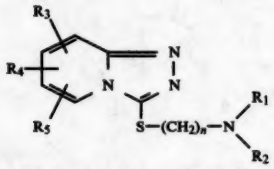
Filed Jul. 10, 1987, Ser. No. 72,337

Claims priority, application France, Jul. 23, 1986, 8610709

Int. Cl.[4] A61K *31/495, 31/535, 31/435, 31/41, 31/44, 31/47;* C07D *403/14, 401/14*

U.S. Cl. 514—253 14 Claims

1. A compound having the formula:



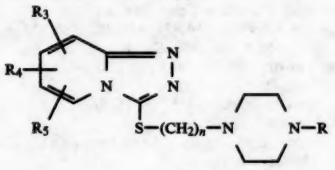
wherein n is an integer from 1 to 8 inclusive;

NR_1R_2 is 4-(3-trifluoromethylphenyl) piperazine-1-yl;

and each of R_3, R_4, R_5 is hydrogen, lower alkyl, hydroxyalkyl, a hydroxybenzyl group, a halogen, a trifluoromethyl, methoxy, thiomethyl, a nitro, or two of them together form a phenyl ring;

and the non-toxic acid addition salts.

9. A compound having the formula:



wherein n is an integer from 1 to 8,

R is:

a phenyl, a phenyl substituted by a lower alkyl having from 1 to 5 carbon atoms, a trifluoromethyl, one or two halogen atoms, a alkoxy, a hydroxyl,

a diphenyl methane group,

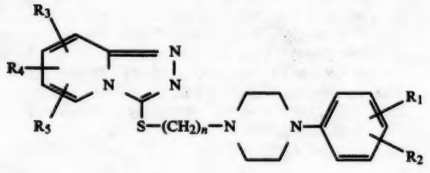
a pyridine group, a pyridine substituted by a trifluoromethyl, a cyano, a nitro, an amino group;

a pyrimidine, a pyrimidine substituted by a trihalogenomethyl, a lower alkyl having from 1 to 5 carbon atoms;

each of R_3, R_4 and R_5 is hydrogen, lower alkyl, hydroxyalkyl, hydroxybenzyl group, halogen, trifluoromethyl, methoxy, thiomethyl, nitro, or two of them together form a phenyl ring;

and the non-toxic acid addition salts.

10. A compound having the formula:



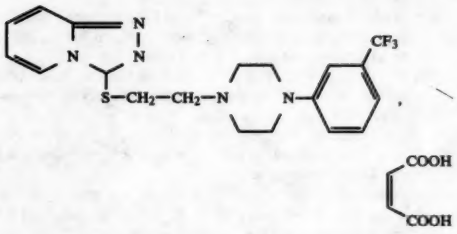
wherein:

n is an integer from 1 to 8 inclusive;

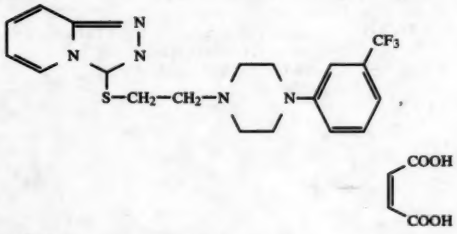
each of R_1 and R_2 is hydrogen, a lower alkyl having 1 to 5 carbon atoms, a trifluoromethyl, a halogen, an alkoxy, a hydroxy;

each of R_3, R_4 and R_5 is hydrogen, lower alkyl, a hydroxyalkyl, hydroxybenzyl group, a halogen, a trifluoromethyl, a methoxy, a thiomethyl, a nitro, or two of them together form a phenyl ring; and the non-toxic acid addition salts.

11. A compound having the formula:



12. A drug having analgesic properties and acting especially on the central nervous system as a minor tranquilizer comprising a therapeutically efficient amount of a compound of the formula:



in a pharmaceutically acceptable vehicle or excipient.

4,886,806

FLAVONE-3-CARBOXYLIC ACIDS COMPOUNDS AND PHARMACEUTICAL COMPOSITIONS CONTAINING THEM

Rainer Walenta, Wedemark; Reiner Müller-Peddinghaus, Bergisch-Gladbach; Ivan Ban, Hanover; Michael Wurl, Garbsen, and Ulf Preuschoff, Laatzen, all of Fed. Rep. of Germany, assignors to Kali-Chemie Pharma GmbH, Hanover, Fed. Rep. of Germany

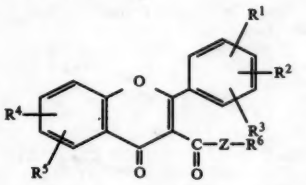
Filed May 5, 1988, Ser. No. 190,401

Claims priority, application Fed. Rep. of Germany, May 12, 1987, 3715779

Int. Cl.[4] **A61K** *31/495, 31/505;* **C07D** *405/12, 405/14*

U.S. Cl. 514—253 **7 Claims**

1. A flavone-3-carboxylic acid compound corresponding to the formula



I

wherein

R^1 represents hydrogen, lower alkyl, halogen, hydroxy, lower alkylcarbonyloxy or an R^9—O group, wherein R^9 represents an alkyl or alkenyl group with up to 20 carbon atoms,

R^2 represents hydrogen, lower alkyl, halogen, hydroxy, lower alkylcarbonyloxy or an R^9—O group, wherein R^9 has the above meaning, and

R^3 represents hydrogen, lower alkyl, halogen, hydroxy,

lower alkylcarbonyloxy or an R^9—O group, wherein R^9 has the above meaning, or

two of the substituent groups R^1 to R^3 are bonded to adjacent carbon atoms and together represent an alkylenedioxy group with 1 or 2 carbon atoms,

with the proviso that if more than one of the substituent groups R^1 to R^3 represent oxygen-containing groups, these groups are identical,

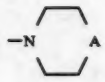
R^4 represents hydrogen, lower alkyl, halogen, hydroxy, lower alkylcarbonyloxy or an R^9—O group, wherein R^9 has the above meaning, and

R^5 represents hydrogen, lower alkyl, halogen, hydroxy, lower alkylcarbonyloxy or an R^9—O group, wherein R^9 has the above meaning, or

R^4 and R^5 are bonded to adjacent carbon atoms and together form an alkylenedioxy group with 1 or 2 carbon atoms,

with the proviso that if both R^4 and R^5 represent oxygen-containing groups, these groups are identical, and, if R^1, R^2 or R^3 represent hydroxy or lower alkylcarbonyloxy groups, oxygen-containing groups R^4 and R^5 are identical to these groups,

R^6 represents a di(lower alkyl)amino group, a pyridyl group, a pyrimidyl group, a 1-benzylpiperidin-4-yl group, or a group corresponding to the formula



a

wherein

A represents a bond, a methylene group, oxygen or an N—R^7 group, wherein

R^7 represents hydrogen, lower alkyl, pyridyl, pyrimidyl, benzyl, benzyl mono-, di- or tri-substituted by lower alkyl or halogen, phenyl or phenyl mono-, di- or tri-substituted by lower alkyl or halogen,

Z represents a Y—$(CH_2)_n$13 group, wherein

Y represents an NR^8 group wherein R^8 is hydrogen or lower alkyl, or, if R^1 through R^5 are other than lower alkylcarbonyloxy or hydroxy, Y may also be oxygen, and

n represents an integer from 2 to 4 or, if R^6 is a 1-benzylpiperidin-4-yl group, n may also be zero, or

Z may also represent a bond if R^6 represents a group a in which A is an N—R^7 group; or an N-oxide or pharmoceutically acceptable acid addition salt thereof.

7. An anti-inflammatory pharmaceutical composition comprising an effective anti-inflammatory amount of a compound according to claim 1 and at least one conventional pharmaceutical carrier or adjuvant, with the proviso that if said compound is an acid addition salt, it is a pharmaceutically acceptable acid addition salt.

4,886,807

NOVEL PYRIMIDOPYRIMIDINE DERIVATIVE, PROCESS FOR PRODUCING IT AND PHARMACEUTICAL COMPOSITION

Norihiko Kitamura, and Akimoto Ohnishi, both of Katoh, Japan, assignors to Nippon Zoki Pharmaceutical Co., Ltd., Osaka, Japan

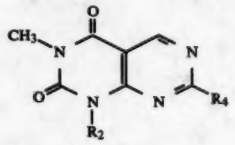
Continuation of Ser. No. 726,618, Apr. 24, 1985, abandoned. This application Nov. 29, 1988, Ser. No. 277,447

Claims priority, application Japan, Apr. 24, 1988, 59-83557

Int. Cl.[4] C07D *471/04;* A01R *31/505*

U.S. Cl. 514—258 **4 Claims**

1. A pyrimidopyrimidine compound of the formula (I):



wherein

R_2 is an alkyl group having 1 to 3 carbon atoms, and

R_4 is an alkyl group having 1 to 3 carbon atoms; a halogenated alkyl group having 1 to 3 carbon atoms, an amino group or an amino group substituted by an alkyl group having 1 to 3 carbon atoms,

or a pharmaceutically acceptable salt thereof.

4,886,808

INDAZOLYL CARBOXYLIC ACID AMIDES USEFUL FOR TREATING MIGRAINE CLUSTERS HEADACHE, TRIGEMINAL NEURALGIA OR EMESIS

Francis D. King, Bishop's Stortford, England, assignor to Beecham Group p.l.c., Brentford, England

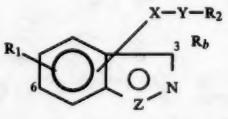
Continuation of Ser. No. 856,452, Apr. 25, 1986. This application Mar. 16, 1988, Ser. No. 171,141

Claims priority, application United Kingdom, Apr. 27, 1985, 8510752; Oct. 21, 1985, 8525913

Int. Cl.[4] C07D *403/12;* A61K *31/415, 31/445*

U.S. Cl. 514—299 **20 Claims**

1. A compound of formula (I), or a pharmaceutically acceptable salt thereof:



(I)

wherein

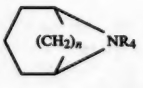
X is CO and Y is NH;

Z is NR_3 wherein R_3 is hydrogen, C_{1-6} alkyl, C_{3-7} alkenylmethyl, phenyl or phenyl C_{1-4} alkyl either of which phenyl moieties may be substituted by one or two of halogen, CF_3, C_{1-6} alkoxy or C_{1-6} alkyl;

R_b is present when X-Y-R_2 is attached at the phenyl ring and is selected from hydrogen, halogen, CF_3, hydroxy, C_{1-6} alkoxy or C_{1-6} alkyl;

R_1 is hydrogen, halogen, CF_3, C_{1-6} alkyl, C_{1-6} alkoxy, C_{1-6} alkylthio, C_{1-7} acyl, C_{1-7} acylamino, C_{1-6} alkylsulphonylamino, N-(C_{1-6} alkylsulphonyl)-N-C_{1-4} alkylamino, C_{1-6} alkylsulphinyl, hydroxy, nitro or amino, aminocarbonyl, aminosulphonyl, aminosulphonylamino or N-(aminosulphonyl)-C_{1-4} alkylamino optionally N-substituted by one or two groups selected from C_{1-6} alkyl, C_{3-8} cycloalkyl, C_{3-8} cycloalkyl C_{1-4} alkyl, phenyl or phenyl C_{1-4} alkyl groups or optionally N-disubstituted by C_{4-5} polymethylene;

R_2 is a group of formula (a),



(a)

wherein n is 2 or 3; and

R_4 is C_{1-7} alkyl, C_{3-8} cycloalkyl, C_{3-8} cycloalkyl-C_{1-2} alkyl, or a group $(CH_2)_tR_6$ where t is 1 or 2 and R_6 is thienyl, pyrrolyl or furyl optionally substituted by one or two substituents selected from C_{1-6} alkyl, C_{1-6} alkoxy, trifluo-

romethyl or halogen, or is phenyl optionally substituted by one or two substituents selected from C_{1-4} alkoxy, trifluoromethyl, halogen, nitro, carboxy, esterified carboxy, and C_{1-4} alkyl optionally substituted by hydroxy, C_{1-4} alkoxy, carboxy, esterified carboxy or in vivo hydrolysable acyloxy.

4,886,809

CARBOSTYRIL DERIVATIVES AND SALTS THEREOF

Shigeharu Tamada; Takafumi Fujioka; Hidenori Ogawa; Shuji Teramoto, and Kazumi Kondo, all of Tokushima, Japan, assignors to Otsuka Pharmaceutical Co., Ltd., Tokyo, Japan

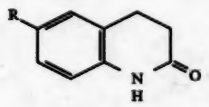
Filed Jul. 30, 1987, Ser. No. 79,875

Claims priority, application Japan, Jul. 31, 1986, 61-181662; Jun. 24, 1987, 62-156887

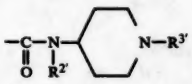
Int. Cl.[4] A61K *31/47*; C07D *401/12*

U.S. Cl. 514—312 8 Claims

1. A carboxtyril compound or salt thereof of the formula



wherein R is a group of the formula



wherein $R^{2'}$ is a hydrogen atom or a lower alkyl group and $R^{3'}$ is a hydrogen atom, a lower alkyl group, a lower alkanoyl group, a phenyl-lower alkyl group which may have 1 to 3 substituents on the phenyl ring selected from the group consisting of a lower alkoxy group, a halogen atom and a nitro group, further the alkyl moiety in the phenylalkyl group may be substitued with a halogen atom, a cyano group or a hydroxyl group, a benzoyl-lower alkyl group, a phenyl-lower alkenyl group, a lower alkenyl group, a phenoxy-lower alkyl group, a phenylthio-lower alkyl group or an anilino-lower alkyl group in which the amino moiety may be substituted with a lower alkyl group; and

the carbon-carbon bond between the 3- and 4-positions in the carbostyril skeleton is a single or double bond.

8. A cardiotonic composition comprising an effective amount of carboxtyril compound or a pharmaceutically acceptable salt thereof of claim 1 as the active ingredient and a pharmaceutically acceptable carrier.

4,886,810

QUINOLINE DERIVATIVES, PHARMACEUTICAL COMPOSITION AND METHOD OF USE

Jun-ichi Matsumoto, Ikoma; Teruyuki Miyamoto, Sakai; Hiroshi Egawa, Toyonaka, and Shinichi Nakamura, Takatsuki, all of Japan, assignors to Dainippon Pharmaceutical Co., Ltd., Osaka, Japan

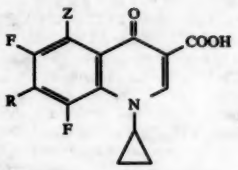
Filed Apr. 27, 1987, Ser. No. 42,806

Claims priority, application Japan, Apr. 25, 1986, 61-97543

Int. Cl.[4] A61K *31/47*; C07D *401/04*

U.S. Cl. 514—312 10 Claims

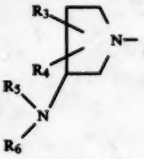
1. A quinoline derivative of the formula



wherein

Z is an amino group or a halogen atom,

R is



in which

R_3 is a lower alkyl or haloalkyl group,

R_4 is a hydrogen atom or a lower alkyl group, and

R_5 and R_6 are the same or different and each represents a hydrogen atom or a lower alkyl group, or a pharmaceutically acceptable ester thereof or a pharmaceutically acceptable salt of said derivative or ester.

10. A method for treatment of a bacterial infectious disease which comprises administering an effective amount of a compound defined in claim 1 to a warm-blooded animal.

4,886,811

QUNOLYLOXAZOLE-2-ONES USEFUL AS PROTEINKINASE C INHIBITORS

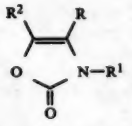
Winton D. Jones; George P. Claxton; Richard C. Dage; Hsien C. Cheng, all of Cincinnati, Ohio, and Phillip J. Robinson, Fitzroy, Australia, assignors to Merrell Dow Pharmaceuticals, Cincinnati, Ohio

Filed Oct. 24, 1988, Ser. No. 261,435

Int. Cl.[4] A61K *31/47*; C07D *413/04*

U.S. Cl. 514—314 11 Claims

1. A compound of the formula



(I)

wherein

R and R^1 are each independently selected from the group consisting of hydrogen, C_1–C_6 alkyl, and C_1–C_3 alkylphenyl wherein the phenyl ring is optionally substituted with one, two or three of the substituents selected from the group consisting of fluorine, chlorine, bromine, C_1–C_4 alkyl, and C_1–C_4 alkoxy; and

R^2 is a 2, 3-, or 4-quinolyl group, optionally substituted with one, two or three of the substituents selected from the group consisting of fluorine, chlorine, bromine, C_1–C_4 alkyl, C_1–C_4 alkoxy, nitro and trifluoromethyl, or R^2 is a 5-, 6-, 7-, or 8-quinolyl group;

or a pharmaceutically-acceptable salt thereof.

4,886,812

TETRAHYDRO-BENZTHIAZOLES, THE PREPARATION THEREOF AND THEIR USE AS INTERMEDIATE PRODUCTS OR AS PHARMACEUTICALS

Gerhart Griss, deceased, late of Biberach (by Elisabeth Griss, legal representative); Claus Schneider, Ingelheim am Rhein; Rudolf Hurnaus, Biberach, all of Fed. Rep. of Germany; Walter Kobinger; Ludwig Pichler, both of Vienna, Austria; Rudolf Bauer, Wiesbaden, Fed. Rep. of Germany; Joachim Mieran, Mainz, Fed. Rep. of Germany; Dieter Hinzen, Zornheim, Fed. Rep. of Germany, and Gunter Schingnitz, Bad Kreuznach, Fed. Rep. of Germany, assignors to Dr. Karl Thomae GmbH, Biberach an der Riss, Fed. Rep. of Germany

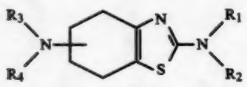
Division of Ser. No. 124,197, Nov. 23, 1987, Pat. No. 4,843,086, which is a division of Ser. No. 810,947, Dec. 19, 1985, Pat. No. 4,731,374. This application Oct. 12, 1988, Ser. No. 256,671

Claims priority, application Fed. Rep. of Germany, Dec. 22, 1984, 34470751; Mar. 13, 1985, 3508947

Int. Cl.[4] C07D *277/82;* A01K *31/425*

U.S. Cl. 514—321 10 Claims

1. A tetrahydro-benzthiazole of the formula:



(I)

wherein

R_1 is a hydrogen atom, an alkyl group having 1 to 6 carbon atoms, an alkenyl or alkynyl group each having 3 to 6 carbon atoms, an alkanoyl group having 1 to 6 carbon atoms, a phenyl alkyl or phenyl alkanoyl group having 1 to 3 carbon atoms in the alkyl part, wherein the above mentioned phenyl nuclei may be substituted by 1 or 2 halogen atoms;

R_2 is a hydrogen atom or an alkyl group with 1 to 4 carbon atoms;

R_3 is a hydrogen atom, an alkyl group with 1 to 7 carbon atoms, a cycloalkyl group having 3 to 7 carbon atoms, an alkenyl or alkynyl group having 3 to 6 carbon atoms, an alkanoyl group having 1 to 7 carbon atoms, a phenyl alkyl or phenyl alkanoyl group having 1 to 3 carbon atoms in the alkyl part, whilst the phenyl nucleus may be substituted by fluorine, chlorine or bromine atoms; and,

R_4 is a hydrogen atom, an alkyl group with 1 to 4 carbon atoms, an alkenyl or alkynyl group having 3 to 6 carbon atoms; or,

R_3 and R_4 together with the nitrogen atom between them form a piperidino, hexamethyleneimino or morpholino group; or, an acid addition salt thereof.

4,886,813

PROLINE DERIVATIVES

Shizuo Nakamura, Naruto; Makoto Inoue, Tokushima; Masatoshi Inai, Tokushima, and Yoshiaki Tsuda, Anan, all of Japan, assignors to Otsuka Pharmaceutical Factory, Inc., Naruto, Japan

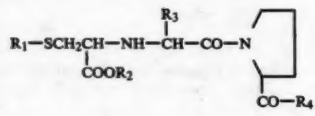
Filed Apr. 28, 1986, Ser. No. 856,901

Claims priority, application Japan, Nov. 13, 1985, 60-254341; Nov. 13, 1985, 60-254342; Apr. 18, 1986, 61-90803

Int. Cl.[4] A61K *31/395;* C07D *401/12*

U.S. Cl. 514—326 21 Claims

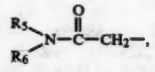
1. A proline derivative represented by the formula



(I)

wherein:

R_1 is adamantyl, indanyl, 1,2,3,4-tetrahydro-naphthyl or cycloalkyl having 3 to 8 carbon atoms and optionally substituted with lower alkyl, or R_1 is C_1–C_9 alkyl or a group



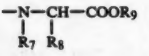
wherein R_5 and R_6 are the same or different and each represent hydrogen, lower alkyl, phenyl, phenyl-lower alkyl, naphthyl or cycloalkyl having 3 to 8 carbon atoms, or R_5R_6N— is

wherein R is alkylene having 3 to 8 carbon atoms;

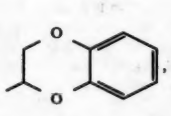
R_2 is hydrogen or lower alkyl;

R_3 is lower alkyl; and

R_4 is hydroxy, lower alkoxy, a group



wherein R_7 is hydrogen and R_8 is hydrogen, lower alkyl or phenyl-lower alkyl, or R_7 and R_8 are taken together and form C_2–C_4 alkylene bridge, and R_9 is hydrogen or lower alkyl, or substituted lower alkoxy wherein the substituent is selected from the group consisting of lower alkoxy, lower alkoxycarbonyl, halogen, carbamoyl, monophenylcarbamoyl, N,N-diphenylcarbamoyl, α-naphthylcarbamoyl, β-naphthylcarbamoyl, pyridyl, a group



4 -(1,1-diphenylmethyl)-1-piperazinyl and lower alkoxycarbonylamino, or R_4 is phenyloxy, α-naphthyloxy, β-naphthyloxy, tocopheryloxy, 1-(phenyl-lower alkyl)-piperidyloxy, amino, lower alkoxy-carbonyl-substituted phenylamino, lower alkyl sulfonylamino, pihenylsulfonylamino, p-toluenesulfonylamino, α-naphthylsulfonylamino, or β-naphthylsulfonylamino, with the proviso that R_4 is not hydroxy or lower alkoxy when R_1 is C_1–C_9 alkyl;

21. A method for inhibiting angiotensin converting enzyme comprising administering to a patient at least one of the proline derivative and pharmaceutically acceptable salt thereof as defined in claim 1 in an amount effective for inhibiting the angiotensin converting enzyme.

4,886,814

SUBSTITUTED THIAZOLES AND OXAZOLES AND 2-HYDROXY-MORPHOLINES

Manfred Reiffen; Rudolf Hurnaus, both of Biberach; Robert Sauter, Laupheim; Wolfgang Grell, Biberach, and Eckhard Rupprecht, Aulendorf-Tannhausen, all of Fed. Rep. of Germany, assignors to Dr. Karl Thomas GmbH, Biberach an der Riss, Fed. Rep. of Germany

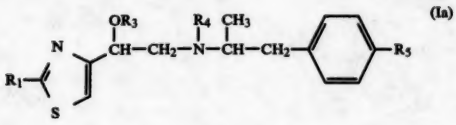
Filed Sep. 4, 1987, Ser. No. 93,415

Claims priority, application Fed. Rep. of Germany, Mar. 13, 1986, 3608290; Jun. 28, 1986, 3621775; May 25, 1987, 3717560

Int. Cl.[4] A61K *31/425, 31/445;* C07D *277/24, 417/12*

U.S. Cl. 514—326 13 Claims

1. A compound of the formula:



(Ia)

in which

R_1 is selected from the group consisting of chloro, methyl and trifluoromethyl,

R_3 is hydrogen,

R_4 is selected from the group consisting of hydrogen, methyl, 2-hydroxyethyl and carbethoxymethyl,

R_5 is selected from the group consisting of carboxymethoxy. carbomethoxymethoxy, ethoxy-carbonylmethoxy, amino-carbonylmethoxy, methylamino-carbonylmethoxy, 2-methylaminoethoxy, 2-hydroxyethoxy and 2-carbomethoxy-1-methylethenyl,

or an optical isomers or diastereomers thereof or a physiologically acceptable acid addition salt thereof with an organic or organic acid.

13. A method of treating an individual afflicted with diabetes mellitus which comprises administering to said individual an effective blood sugar lowering amount of a compound as recited in claim 1.

4,886,815

TREATMENT AND PREVENTION OF RETINAL EDEMA WITH DOPAMINERGIC ANTAGONISTS

Ronald A. Schachar, P.O. Box 145, Denison, Tex. 75020

Division of Ser. No. 725,104, Apr. 19, 1985, Pat. No. 4,624,957, and a continuation-in-part of Ser. No. 622,495, Jun. 20, 1984, abandoned. This application Oct. 24, 1986, Ser. No. 922,925

Int. Cl.[4] A61K *31/445, 31/54, 31/38, 31/34*

U.S. Cl. 514—327 27 Claims

1. A method of prevening retinal edema due to accumulated fluid leaking from capillary vessels comprising administering to a patient in need thereof a preventive effective amount of a dopaminergic antagonist selected from the group consisting of phenothiazine derivatives: thioxanthines, dibenzoxepines and butyrophenones to prevent said edema together with an amount of ascorbic acid effective to potentiate the activity of said dopaminergic antagonist.

4,886,816

CIRCULATION-ACTIVE DIOXYALKYLENEARYL-DIHYDROPYRIDINES

Gerhard Franckowiak, Wuppertal; Albrecht Marhold, Leverkusen; Martin Bechem; Rainer Gross, both of Wuppertal; Michael Kayser, Leverkusen; Matthias Schramm, Cologne, all of Fed. Rep. of Germany, and Günther Thomas, Arese, Italy, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

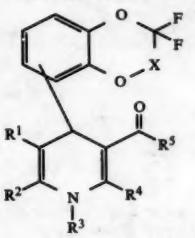
Filed May 5, 1988, Ser. No. 190,748

Claims priority, application Fed. Rep. of Germany, May 19, 1987, 3716652

Int. Cl.[4] C07D *405/10;* A61K *31/36*

U.S. Cl. 514—338 12 Claims

1. A dioxyalkylenearyl-dihydropyridine of the formula



in which

R^1 represents hydrogen, cyano or nitro, or represents a radical of the formula $—CO_2R^7$,

wherein

R^7 denotes hydrogen or straight-chain, branched or cyclic alkyl or alkenyl which has up to 16 carbon atoms and is optionally substituted by one or more identical or different halogen substituents,

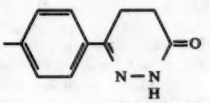
R^2 and R^4 are identical or different and in each case represent straight-chain, branched or cyclic alkyl with up to 8 carbon atoms, or represent phenyl or benzyl, or one of the substituents R^2 or R^4 represents straight-chain or branched alkyl which has up to 6 carbon atoms and is substituted by halogen, C_2–C_7-acyloxy, hydroxyl, amino, alkoxy, dialkoxy or aminoalkoxy, with in each case up to carbon atoms per alkoxy group or represents formyl or cyano,

R^3 represents hydrogen, or represents straight-chain or branched alkyl which has up to 4 carbon atoms and is optionally interrupted in the chain by an oxygen atom,

R^5 represents straight-chain, branched or cyclic alkyl with up to 8 carbon atoms, or represents a group $—OR^8$,

wherein

R^8 denotes hydrogen or straight-chain, branched or cyclic alkyl or alkenyl which has up to 16 carbon atoms and is optionally interrupted in the chain by an oxygen atom or a sulphur atom and/or is optionally substituted by one or more identical or different substituents from the group consisting of halogen, cyano, hydroxyl, C_2–C_7-acyloxy and nitro, or by a group of the formula



or by a phenyl phenoxy, phenylthio or phenylsulphonyl group which is optionally substituted by halogen, cyano, di-C_1–C_5-alkylamino, C_1–C_6-alkoxy, C_1–C_6-alkyl, trifluoromethyl or nitro, or by an amino group, this amino group carrying two identical or different substituents from the group consisting of C_1–C_6-alkyl, C_6–C_{14}-aryl and C_7–C_{14}-aralkyl, and

X denotes a direct bond or —CF_2— or —CHF—, or a physiologically acceptable salt thereof.

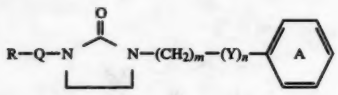
4,886,817

IMIDAZOLIDINONES AS BRAIN ACTIVATORS

Mikio Takeda, Urawa; Masaru Inage, Kitamoto; Hiroshi Wada, Nishinomiya; Hajime Tamaki, Sakado, and Takashi Ochiai, Kobe, all of Japan, assignors to Tanabe Seiyaku Co., Ltd., Japan

Continuation-in-part of Ser. No. 115,719, Nov. 2, 1987, abandoned. This application Dec. 29, 1988, Ser. No. 292,211
Claims priority, application Japan, Nov. 14, 1986, 61-272655
Int. Cl.[4] A61K *31/44*; C07D *401/04*
U.S. Cl. 514—341 16 Claims

1. An imidazolidinone compound of the formula:



(I)

wherein

Q is methylene group or a single bond:

R is a heterocyclic group selected from the group consisting of pyridyl, pyridazinyl, pyrimidinyl, pyrazinyl and 1,3-thiazolyl which may be unsubstituted or substituted with a substituent selected from the group consisting of lower alkyl, a lower alkoxy and halogen atom and wherein R is bonded to Q or, when Q is a single bond, to the imidazolidinone ring, through the carbon atom of R;

the ring A is an unsubstituted phenyl group or a phenyl group having 1 or 2 substituent(s) selected from the group consisting of lower alkyl, lower alkoxy, halogen, lower alkylthio, trihalogeno-lower alkyl and nitro;

Y is vinylene group or ethynylene;

m is an integer from 1 to 6 and

n is 0, 1 or 2,

or a pharamacutically acceptable salt thereof.

4,886,818

INHIBITING GROWTH OF TUMORS WITH CERTAIN SUBSTITUTED PHENOXY DIMETHYL ACIDS, ESTERS OR SALTS

Yoso Numasaki, Saitama; Koichiro Takahashi, Tokyo, and Isao Ohata, Saitama, all of Japan, assignors to Yamanouchi Pharmaceutical Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 874,547, Jun. 16, 1986, Pat. No. 4,758,580. This application May 24, 1988, Ser. No. 198,099
Claims priority, application Japan, Jun. 26, 1985, 60-140901
The portion of the term of this patent subsequent to Jul. 19, 2005, has been disclaimed.
Int. Cl.[4] A61K *31/44*, *31/435*, *31/415*
U.S. Cl. 514—345 4 Claims

1. A method of inhibiting the growth of tumors in a mammal wherein the growth of said tumors is susceptible to treatment by a compound selected from the group consisting of

ethyl 6-[p-{5-(1-imidazolyl)pentyloxy}phenoxy]-2,2-dimethylhexanoate hydrochloride,

ethyl 7-[p-[5-(1-imidazolyl)pentyloxy]phenoxy]-2,2-dimethylheptanoate, and

ethyl 6-[p-[5-(2-pyridyloxy)pentyloxy]phenoxy]-2,2-dimethylhexanoate, which comprises administering to said mammal an anti-tumor effective amount of said compound.

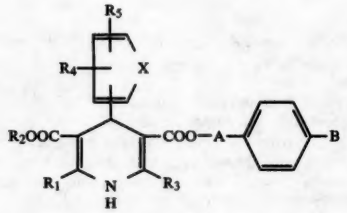
4,886,819

DIHYDROPYRIDINE DERIVATIVES AND PHARMACEUTICAL COMPOSITION THEREOF

Atsuyuki Ashimori; Taizo Ono; Yoshihisa Inoue, all of Kyoto; Chikara Fukaya, and Kazumasa Yokoyama, both of Osaka, all of Japan, assignors to The Green Cross Corporation, Higashi, Japan

Filed Aug. 20, 1987, Ser. No. 87,513
Claims priority, application Japan, Aug. 27, 1986, 61-200849; Oct. 23, 1986, 61-253077; May 12, 1987, 62-115590
Int. Cl.[4] C07D *211/86*; A61K *31/455*
U.S. Cl. 514—356 15 Claims

1. A compound of the formula



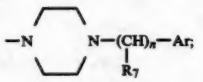
wherein each of R_1, R_2 and R_3 is, independently, lower alkyl, C_{3-6} cycloalkyl or lower alkoxy lower alkyl;

each of R_4 and R_5 is, independently, a hydrogen atom, halogen, nitro, halogenated lower alkyl, lower alkylsulfonyl, halogenated lower alkoxy, lower alkylsulfinyl, lower alkyl, C_{3-6} cycloalkyl, lower alkoxy, cyano, lower alkoxycarbonyl or lower alkylthio (wherein both R_4 and R_5 are not hydrogen atoms at the same time);

X is a group represented by vinylene or azomethine;

A is alkylene having from 2 to 4 carbon atoms;

B is $-N(R_6)_2$ or



each of R_6 and R_7 is, independently, a hydrogen atom, lower alkyl, C_{3-6} cycloalkyl, aralkyl (the alkyl of which has from 1 to 3 carbon atoms), phenyl, substituted phenyl, naphthyl, substituted napthyl (any substituent of substituted phenyl or of substituted naphthyl having one of the meanings of R_4), or pyridyl;

each of Ar and ar of aralkyl is phenyl, substituted phenyl, naphthyl, substituted naphthyl (any substitutent of substituted phenyl or of substituted naphthyl having one of the meanings of R_4) pyridyl and

n is an integer from 0 to 2, inclusive. or an acid-addition salt thereof.

4,886,820

DIHYDROPYRIDINE COMBINATION PRODUCT COMPRISING A DIHYDROPYRIDINE COMPOUND AND A CARDIOACTIVE NITRATE

Rainer Gross, Wuppertal, and Matthias Schramm, Cologne, both of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Continuation-in-part of Ser. No. 98,353, Sep. 18, 1987, abandoned, which is a continuation-in-part of Ser. No. 875,139, Jun. 17, 1986, abandoned. This application Nov. 3, 1988, Ser. No. 274,182

Claims priority, application Fed. Rep. of Germany, Jul. 2, 1985, 3523540

Int. Cl.[4] A61K *31/34, 31/44*

U.S. Cl. 514—356 5 Claims

1. A solid medicament formulation for treatment of diseases of the coronaries and of the myocardium and which can be administered orally, comprising a synergistically effective mixture of a dihydropyridine selected from the group consisting of nisoldipine and nitrendipine and a cardioactive nitrate selected from the group consisting of isosorbide-5-mononitrate and isosorbide-dinitrate, wherein there is one part of the dihydropyridine per 1 to 1000 parts of the nitrate.

4,886,821

2-PYRIDINECARBOTHIOAMIDES AND PHARMACEUTICAL COMPOSITIONS COMPRISING THE SAME USEFUL AS ANTI ULCER AGENTS

William A. Kinney, Langhorne, Pa.; Amadeo A. Failli, Princeton Junction, N.J., and Ghulam N. Mir, Buckingham, Pa., assignors to American Home Products Corporation, New York, N.Y.

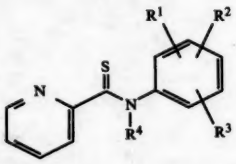
Filed Nov. 23, 1987, Ser. No. 123,740

Claims priority, application Canada, Jan. 27, 1987, 528269; Oct. 27, 1987, 550348

Int. Cl.[4] A61K *31/44;* C07D *211/70*

U.S. Cl. 514—357 18 Claims

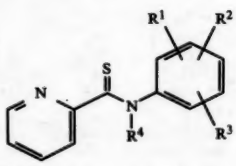
1. A compound of the formula (I)



(I)

wherein R^1 is fluorine, R^2 and R^3 are each hydrogen or fluorine, and R^4 is hydrogen or lower alkyl containing 1 to 6 carbon atoms.

18. The method of treating ulcers or inducing cytoprotection in humans by increasing the natural defences of the gastrointestinal mucosa which comprises administering to a human in need of such therapy an effective amount of a compound of structural formula (I)



(I)

wherein R^1, R^2 and R^3 are each hydrogen or fluorine, R^4 is hydrogen or lower alkyl containing 1 to 6 carbon atoms

4,886,822

SUBSTITUTED ANILIDE COMPOUNDS WHICH ARE USEFUL IN THE TREATMENT OF ARRHYTHMIA

Kimiyuki Shibuya; Yoshio Takahashi, both of Higashimurayama; Seiichi Sato, Tokyo; Hiromichi Shigyo, Fuchu; Tomio Ohta, Sayama, and Yasumi Uchida, Ichikawa, all of Japan, assignors to Kowa Company, Ltd., Aichi, Japan

Filed Apr. 8, 1988, Ser. No. 179,218

Claims priority, application Japan, Apr. 10, 1987, 62-87021

Int. Cl.[4] C07D *213/54;* A61K *31/44*

U.S. Cl. 514—357 12 Claims

1. A substituted anilide derivative of the formula wherein

R_1 represents a pyridyl group,

R_2 represents a hydrogen atom, a halogen atom, a lower alkyl group, a trifluoromethyl group, a lower alkenyloxy group, a trifluoroethoxy group or a C_1–C_{14} alkoxy group,

R_3 and R_4 are identical or different, and each represents a hydrogen atom or a lower alkyl group, and

B represents a lower alkylene group, or an acid/addition salt thereof.

12. A method for treating arrhythmia in an individual which comprises administering an effective amount of a compound of formula (I) in claim 1 or a pharmaceutically acceptable salt thereof to an individual.

4,886,823

FURAZANYLUREA ACARICIDES

Wilhelm Sirrenberg, Sprockhoevel; Albrecht Marhold, and Ulrike Wachendorff-Neumann, both of Leverkusen, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

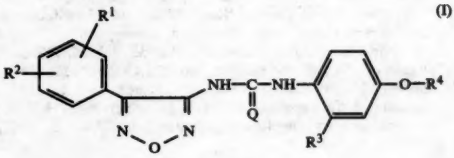
Filed Nov. 9, 1988, Ser. No. 269,263

Claims priority, application Fed. Rep. of Germany, Nov. 17, 1987, 3738946

Int. Cl.[4] C07D *271/08;* A01N *47/36*

U.S. Cl. 514—364 11 Claims

1. A 1-arylfurazanyl-3-(2-alkyl-4-halogenoalkoxy-phenyl)-(thio)urea of the formula



(I)

in which

Q stands for oxygen or sulphur,

R^1 stands for hydrogen, halogen, C_1–C_6-alkyl, C_1–C_4-halogenoalkyl, C_1–C_6-alkoxy, C_1–C_4-halogenoalkoxy, C_1–C_6-alkylthio or for C_1–C_4-halogenoalkylthio, and

R^2 stands for hydrogen, halogen, C_1–C_4-alkyl or C_1–C_4-alkoxy, or

R^1 and R^2 together stand for C_1–C_3-alkylene-dioxy which is optionally substituted by fluorine and/or chlorine,

R^3 stands for C_1–C_4-alkyl, and R^4 stands for C_1–C_6-alkyl which is substituted by fluorine and optionally in addition by chlorine and/or bromine.

4,886,824

COMPOSITIONS FOR CONTROLLING PLANT DISEASES AND THE USE THEREOF IN PLANT PROTECTION

Wilhelm Ruess, Pfeffingen; Pierre Urech, Wettingen; Jürg Eberle, Oberwil, and Theodor Staub, Riehen, all of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Continuation-in-part of Ser. No. 891,935, Jul. 30, 1986, abandoned, which is a continuation of Ser. No. 722,420, Apr. 12, 1985, abandoned, which is a continuation of Ser. No. 499,061, May 27, 1983, abandoned. This application Jul. 5, 1988, Ser. No. 215,103

Claims priority, application Switzerland, Jun. 8, 1982, 3528/82

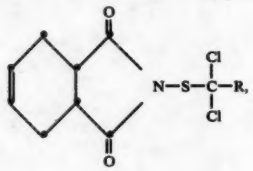
Int. Cl.[4] A01N *43/38, 43/64*

U.S. Cl. 514—383 11 Claims

1. A composition for controlling fungal diseases in agriculture and horticulture comprising a fungicidally effective amount of a mixture of

(a) 1-[2-(2,4-dichlorophenyl)pentyl]-1H-1,2,4,-triazole (compound I) and

(b) an N-haloalkanesulfenylphthalimide derivative of the formula II



(II)

wherein each dotted line indicates a saturated carbon-carbon bond and R represents a chlorine atom or a —$CHCl_2$ group, or wherein each dotted line indicates a carbon-carbon double bond and R represents a chlorine atom, the weight ratio of said compound I to said compound II being from 1:3 to 1:100, in combination with a solid or liquid carrier wherein the amount of compound I is sufficient to potentiate the fungicidal activity of said phthalimide compound.

4,886,825

COMPOSITIONS FOR CONTROLLING PLANT DISEASES AND THE USE THEREOF IN PLANT PROTECTION

Wilhelm Ruess, Pfeffingen; Pierre Urech, Wettingen; Jürg Eberle, Oberwil, and Theodor Staub, Riehen, all of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Continuation-in-part of Ser. No. 891,935, Jul. 30, 1986, abandoned, Continuation of Ser. No. 722,420, Apr. 12, 1985, abandoned, Continuation of Ser. No. 499,061, May 27, 1983, abandoned. This application Jul. 5, 1988, Ser. No. 215,102

Claims priority, application Switzerland, Jun. 8, 1982, 3528/82

Int. Cl.[4] A01N *43/64, 47/10*

U.S. Cl. 514—383 5 Claims

1. A composition for controlling fungal diseases in agriculture and horticulture comprising a fungicidally effective amount of an admixture of:

(a) 1-[2-(2,4-dichlorophenyl)pentyl]-1H-1,2,4,-triazole (compound I) and (b) an [ethylenebis(dithiocarbamato)]manganese complex with [ethylenebis(dithiocarbamato)]zinc of the formula II: t,0130

the weight ratio of said compound I to said compound II being from 1:3 to 1:100, in combination with a solid or liquid carrier, wherein the amount of compound I is sufficient to potentiate the fungicidal activity of said complex.

4,886,826

SUBSTITUTED 2,3,4,9-TETRAHYDRO-1H-CARBAZOLE-1-ACETIC ACID DERIVATIVES, COMPOSITION AND USE

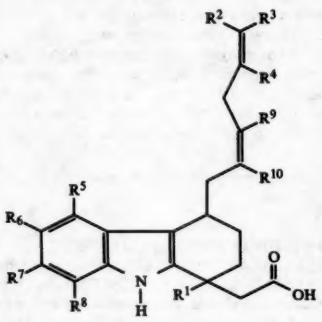
Dominick Mobilio, Franklin Park, N.J., assignor to American Home Products Corporation, New York, N.Y.

Filed Jun. 1, 1989, Ser. No. 359,560

Int. Cl.[4] A61K *31/40;* C07D *209/86*

U.S. Cl. 514—411 5 Claims

1. A compound of the formula (II)



(II)

wherein R^1 is lower alkyl containing 1 to 6 carbon atoms and R^2, R^3 and R^4 are independently H, lower alkyl containing 1 to 6 carbon atoms or R^3 and R^4 are joined to form

or $(CH_2)_n$ wherein n is 3 to 5 R^5, R^6, R^7 and R^8 are independently H, lower alkyl containing 1 to 6 carbon atoms, halogen, haloalkyl; R^9 and R^{10} are independently H, lower alkyl containing 1 to 6 carbon atoms or R^9 and R^{10} are joined to form

3 to 5 or the pharmaceutically wherein m is pharmaceutically acceptable salts thereof.

5. A method for treating inflammatory or painful conditions in a mammal which comprises the administration to said mammal of an effective amount of a compound selected from those of formula (II), or a pharmaceutically acceptable salt thereof, as defined in claim 1.

4,886,827

CIS,ENDO-2-AZABICYCLOALKANE-3-CARBOXYLIC ACID DERIVATIVES, THEIR USE AND INTERMEDIATES IN THEIR PREPARATION

Hansjörg Urbach, Kronberg/Taunus; Rainer Henning, Hattersheim am Main, and Winfried Hertzsch, Kelkheim, all of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Fed. Rep. of Germany

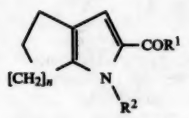
Continuation of Ser. No. 769,356, Aug. 26, 1985, abandoned. This application Jun. 2, 1988, Ser. No. 205,001

Claims priority, application Fed. Rep. of Germany, Aug. 28, 1984, 3431541

Int. Cl.[4] C07D *209/52;* A61K *31/405*

U.S. Cl. 514—412 3 Claims

1. A compound of the formula



in which

n is 1, 2 or 3

R^1 denotes hydroxyl or (C_1–C_6)-alkoxy and

R^2 denotes p-nitrobenzyl, p-methoxybenzyl, alpha-phenylethyl or benzhydryl.

4,886,828

Δ^{22}-DERIVATIVES OF LL-F28249 COMPOUNDS

Goro Asato, Titusville, and Susan Y. Tamura, Plainsboro, both of N.J., assignors to American Cyanamid Company, Stamford, Conn.

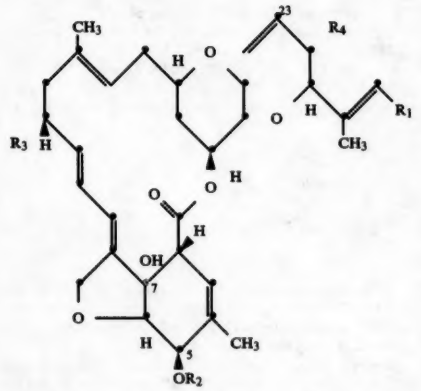
Filed Sep. 12, 1986, Ser. No. 907,284

Int. Cl.[4] A61K *31/365*

U.S. Cl. 514—450 14 Claims

1. A compound represented by structural formula (I),

(I)



wherein R_1 is methyl, ethyl or isopropyl; R_2 is hydrogen or methyl; R_3 is hydrogen, methyl or ethyl; R_4 is methyl or ethyl; or a pharmaceutically and pharmacologically acceptable salt thereof.

4,886,829

23-OXO (KETO) AND 23-IMINO DERIVATIVES OF MONO- AND DIEPOXY LL-F28249 COMPOUNDS

Goro Asato, Titusville, and Susan Y. Tamura, Hamilton Square, both of N.J., assignors to American Cyanamid Company, Stamford, Conn.

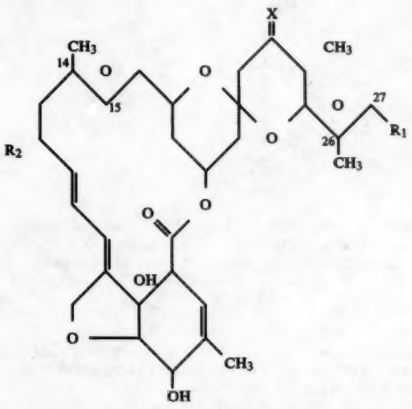
Filed Mar. 6, 1987, Ser. No. 22,850

Int. Cl.[4] A61K *31/335;* C07D *313/96*

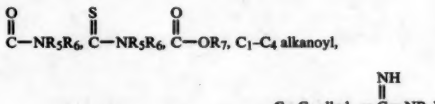
U.S. Cl. 514—450 22 Claims

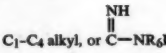
1. A compound represented by structural formula (I):

(I)



wherein R_1 is methyl or isopropyl; R_2 is hydrogen, methyl or ethyl; X is oxygen, NOR_3, or N—NHR_4; R_3 is hydrogen, C_1–C_6 alkyl, benzyl, allyl, propargyl, phenyl, CH_2COO-alkyl (C_1–C_4), N-(C_1–C_6 alkyl)carbamoyl, N-(allyl)carbamoyl, N-(propargyl) carbamoyl, N-(phenyl)carbamoyl, N-(chlorophenyl)carbamoyl, N-(dichlorophenyl)carbamoyl, N-(benzyl)-carbamoyl, C_1–C_6 alkanoyl, chloroacetyl, methoxyacetyl, phenylacetyl, benzoyl or chlorobenzoyl; R_4 is



C_1–C_4 alkyl, or  ;

R_5 and R_6 are hydrogen or C_1–C_4 alkyl; R_7 is C_1–C_4 alkyl; and the dotted triangular figure with oxygen at C(14, 15) indicates that either a double bond or an epoxide is present; with the proviso that R_2 cannot be methyl when X is oxygen or NOR_3 and R_3 is hydrogen, C_1–C_6 alkyl or allyl.

4,886,830

MONO- AND DIEPOXIDE DERIVATIVES OF 23-DEOXYL-LL-F28249 COMPOUNDS

Goro Asato, Titusville, and Susan Y. Tamura, Hamilton Square, both of N.J., assignors to American Cyanamid Company, Stamford, Conn.

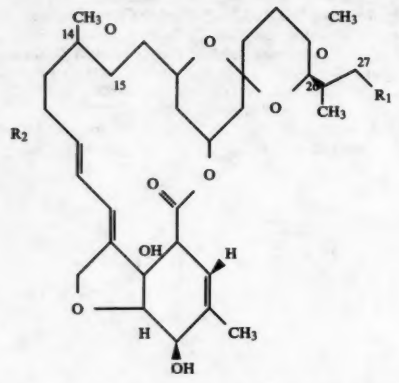
Filed Mar. 6, 1987, Ser. No. 22,847

Int. Cl.[4] A61K *31/335;* C07D *311/96*

U.S. Cl. 514—450 9 Claims

1. A compound represented by structural formula (I):

(I)



wherein, R_1 is methyl or isopropyl; R_2 is hydrogen or ethyl; and the dotted triangular figure with oxygen at C(14,15) indicates that either a double bond or an epoxide is present.

4,886,831

MEDICAL USES FOR PHYCOCYANIN

N. Charle Morcos, Irvine, and Walter L. Henry, South Laguna, both of Calif., assignors to The Regents of the University of California, Berkeley, Calif.

Filed Mar. 16, 1987, Ser. No. 25,987

Int. Cl.[4] A61K *31/35, 37/00*

U.S. Cl. 514—456 **10 Claims**

1. A method for treating atherosclerosis by destroying atherosclerotic plaques comprising:

a. intravascular injection of a pyhysiologtically compatible solution containing an effective amount of phycocyanin to effect contact of said phycocyanin with said atherosclerotic plaques;

b. intravascular insertion of a means for irradiating said plaques in contact with said phycocyanin with light of certain wavelengths; and

c. exposure of said plaques to said means of irradiating light for a period of time effective to destroy said plaques.

4,886,832

FUNGICIDAL BENZALDOXIME DERIVATIVES

Christa Fest, Wuppertal; Kurt Findeisen, Odenthal; Wilhelm Brandes, Leichlingen; Stefan Dutzmann, Duesseldorf; Gerd Hänssler, and Paul Reinecke, both of Leverkusen, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed Mar. 10, 1988, Ser. No. 166,335

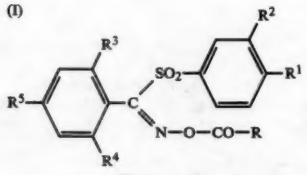
Claims priority, application Fed. Rep. of Germany, Mar. 14, 1987, 3708320

Int. Cl.[4] A01N *47/12*

U.S. Cl. 514—477 **12 Claims**

1. A benzaldoxime derivative of the formula

(I)



in which

R represents straight-chain or branched alkyl with 1 to 6 carbon atoms, or represents straight-chain or branched alkoxy with 1 to 6 carbon atoms, or represents halogenoalkyl or halogenoalkoxy with in each case 1 to 6 carbon atoms in the straight-chain or branched halogenoalkyl radical and 1 to 9 identical or different halogen atoms, or represents straight-chain or branched alkenyloxy with 2 to 6 carbon atoms, or represents aryl or aryloxy which have 6 to 10 carbon atoms and are unsubstituted or in each case substituted by one to five identical or different substituents from the group comprising straight-chain or branched alkyl with 1 to 4 carbon atoms, straight-chain or branched alkoxy with 1 to 4 carbon atoms, halogen, nitro and acetyl, or represents aralkyloxy which has 6 to 12 carbon atoms in the aryl radical and 1 to 6 carbon atoms in the straight-chain or branched alkyl radical and is unsubstituted or substituted by one to five identical or different substituents from the group comprising straight-chain or branched alkyl and alkoxy with 1 to 4 carbon atoms, halogen, nitro and acetyl, or represents cycloalkoxy which has 5 to 7 carbon atoms in the cycloalkyl part and is unsubstituted or substituted by one to five identical or different substituents from the group comprising straight-chain or branched alkyl with 1 to 4 carbon atoms, or represents a saturated or partly or completely unsaturated heterocyclic radical which has 5 to 8 ring members, can contain 1 to 3 hetero atoms and is unsubstituted or substituted by one to three identical or different substituents from the group comprising straight-chain or branched alkyl with 1 to 4 carbon atoms;

R^1 represents hydrogen, halogen, straight-chain or branched alkyl with 1 to 6 carbon atoms or straight-chain or branched alkoxy with 1 to 6 carbon atoms, and

R^2 represents hydrogen or straight-chain or branched alkyl with 1 to 6 carbon atoms, or represents straight-chain or branched halogenoalkyl with 1 to 6 carbon atoms and 1 to 9 identical or different halogen atoms.

10. A fungicidal composition comprising a fungicidally effective amount of a compound according to claim 1 and a diluent.

4,886,833

2-CYANO-2-ALKOXIMINO-ACETAMIDES

Herbert Gayer, Monheim; Klaus Jelich; Winfried Lunkenheimer, both of Wuppertal; Wilhelm Brandes, Leichlingen, and Gerd Hänssler, Leverkusen, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

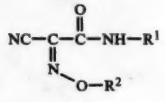
Filed Aug. 24, 1987, Ser. No. 88,922

Claims priority, application Fed. Rep. of Germany, Sep. 10, 1986, 3630732

Int. Cl.[4] C07C *131/00;* A01N *37/44*

U.S. Cl. 514—521 **9 Claims**

1. A 2-cyano-2-alkoximino-acetamide of the formula



in which

R^1 represents in each case straight-chain or branched, optionally phenyl-substituted hydroxyalkyl or hydroxyalkoxyalkyl in each case having 1 to 6 carbon atoms in the individual alkyl parts,

R^2 represents straight-chain or branched alkyl, having 1 to 18 carbon atoms, which is optionally monosubstituted or polysubstituted, the substituents being identical or different and being cyano, in each case straight-chain or branched alkanoyl, alkoxycarbonyl or alkylcarbonyloxy in each case having 1 to 6 carbon atoms in the individual alkyl parts, and phenyl or heteroaryl which is in each case

optionally monosubstituted or polysubstituted by lower alkyl and/or halogen; and in addition represents in each case straight-chain or branched alkenyl or halogenoalkyl in each case having 3 to 8 carbon atoms and, in the case of halogenoalkenyl, having 1 to 5 halogen atoms, or straight-chain or branched alkinyl having 3 to 8 carbon atoms, the heteroaryl when present being pyridyl, pyrimidyl, triazinyl, quinolyl, isoquinolyl, oxazolyl, isoxazolyl, oxadiazolyl, benzoxazolyl, thiazolyl, isothiazolyl, thiadiazolyl, benzthiazolyl, imidazolyl, benzimidazolyl, pyrrolyl, furanyl, thienyl, pyrazolyl or triazolyl.

4,886,834

DIPHENYL-METHANE COMPOUNDS USEFUL IN THE TREATMENT OF DISEASES CAUSED BY AGGREGATION OF PLATELETS OR FORMATION OF THROMBUS

Youji Yamagishi, Ohaza Kamiinayoshi; Kozo Akasaka; Takeshi Suzuki, both of Ushiku; Mitsuaki Miyamoto, Niihari; Kouji Nakamoto, Tsuchiura; Kazuo Okano, Tsukuba; Shinya Abe; Hironori Ikuta, both of Ushiku; Kenji Hayashi, Tsukuba; Hiroyuki Yoshimura, Tsukuba; Tohru Fujimori, Tsukuba; Koukichi Harada, Tsukuba, and Isao Yamatsu, Ushiku, all of Japan, assignors to Eisai Co., Ltd., Tokyo, Japan

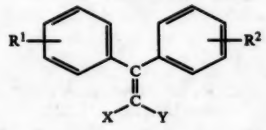
Filed Mar. 11, 1987, Ser. No. 24,737

Claims priority, application Japan, Mar. 17, 1986, 61-57061; Mar. 29, 1986, 61-65963

Int. Cl.[4] C07C *121/40*

U.S. Cl. 514—521 23 Claims

1. A method of treating a patient having a disease caused by aggregation of platelets or formation of thrombus, which comprises administering to said patient a therapeutically effective amount of a compound having the formula



wherein each of R^1 and R^2 is hydrogen, hydroxyl or lower alkoxy;

X is cyano and

Y is

(1) $—R^{10}—COOR^3$, wherein R^3 is hydrogen or lower alkyl and R^{10} is alkylene having 1 to 3 carbon atoms,

(2) $—CONR^4R^5$, wherein each of R^4 and R^5 is hydrogen, alkyl, lower aralkyl,

(3) $—CH_2NHSO_2—R^{12}$ wherein R^{12} is

(4)

wherein V is O or S,

R^7 is lower alkoxy or aryl,

R^9 is alkyl, or aryl,

or pharmacologically acceptable salt thereof, in combination with a pharmaceutically acceptable carrier.

4,886,835

ALKADIENE DERIVATIVES, THEIR PREPARATION, AND PHARMACEUTICAL COMPOSITIONS CONTAINING THEM

Jean-Luc Malleron, Marcoussis; Gerard Ponsinet, Sucy-en-Brie, and Gerard Roussel, Soisy-sur-Seine, all of France, assignors to Rhone-Poulenc Sante, Antony, France

Filed Sep. 26, 1988, Ser. No. 248,720

Claims priority, application France, Sep. 28, 1987, 87 13357

Int. Cl.[4] A61K *31/235, 31/225;* C07C *149/40, 149/20*

U.S. Cl. 514—532 11 Claims

1. A substituted alkadiene of formula:

(I)

in which R_1 denotes hydroxy or acetoxy, R_2 denoted hydrogen, carboxy, alkoxycarbonyl, phenyl or benzoyl, and R_3 denotes alkoxycarbonyl or cycloalkyloxycarbonyl in which the cycloalkyl portion contains 3 to 6 carbon atoms, and R_4 denotes (a) alkylthio, (b) naphthylmethanethio, (c) benzylthio, (d) benzylthio substituted by one or more alkyls or by trifluoromethyl, phenyl or phenoxy, (e) phenylthio, (f) phenylthio substituted by halogen or alkoxy, (g) naphthylthio, (h) phenethylthio or (i) allylthio, with the proviso that except where otherwise stated in the definitions above, the alkyl and alkoxy radicals and alkyl and alkoxy portions contain 1 to 4 carbon atoms each in a straight or branched chain, and the tautomeric forms of the said substituted alkadienes when R_1 denotes hydroxy.

11. A pharmaceutical composition containing at least one activwe substance according to claim 1 and one or more compatible and pharmaceutically acceptable diluents or adjuvants.

4,886,836

ACTIVATED MEDIUM WITH LOW NON-SPECIFIC PROTEIN ADSORPTION

Thomas C. Gsell, Glen Cove; Richard F. Salinaro, Hasting-on-Hudson, and Peter J. Degen, Huntington, all of N.Y., assignors to Pall Corporation, Glen Cove, N.Y.

Filed Jun. 3, 1987, Ser. No. 56,943

Int. Cl.[4] C08J *9/36*

U.S. Cl. 521—53 65 Claims

1. A porous chemically activated medium comprising:

a porous polymeric medium having a low affinity for peptide group-containing materials, as measured by the Immersion Protein Binding Assay, covalently bound to a residue of an activating agent said residue being capable of reacting with an acceptor molecule.

4,886,837

PROCESS FOR PREPARING RIGID POLYVINYL CHLORIDE STRACTURED FOAMS HAVING SUPERIOR SURFACE CHARACTERISTICS

Kwang-Ung Kim; Byoung-Chul Kim, and Soon-Man Hong, all of Seoul, Rep. of Korea, assignors to Korea Advanced Institute of Science & Technology, Seoul, Rep. of Korea

Filed Nov. 30, 1988, Ser. No. 277,894

Claims priority, application Rep. of Korea, Dec. 9, 1987, 14012/87[U]

Int. Cl.[4] C08J *9/06*

U.S. Cl. 521—85 1 Claim

1. A raw composition for use in producing a polyvinyl chloride foam which comprises 100 phr of vinyl chloride resin, 5 phr of a processing aid, 2 phr of a heat stabilizer, 0.5 phr of a lubricant, 0.75 phr of a foaming agent, 0.75 phr of boric acid, 3–10 phr of dioctyl phthalate, and 4–20 phr of a methyl methacrylate-butadiene-styrene copolymer.

4,886,838

INTERNAL MOLD RELEASE AGENT FOR USE IN REACTION INJECTION MOLDING

John E. Dewhurst, Macungie, Pa., assignor to Mobay Corporation, Pittsburgh, Pa.

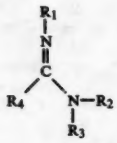
Filed Aug. 31, 1988, Ser. No. 239,153
Int. Cl.[4] C08G 18/14
U.S. Cl. 521—117 1 Claim

1. A process for preparing a molded product comprising introducing a reaction mixture into a closed mold via the RIM process wherein said reaction mixture comprises an organic isocyanate, an isocyanate-reactive component, and an internal mold release composition comprising

(a) a zinc carboxylate containing from 8 to 24 carbon atoms per carboxylate group, and

(b) a compatibilizer comprising a salt of

(i) an amidine group-containing compound of the formula



wherein

R_1, R_2 and R_3 are straight or branched, saturated or unsaturated hydrocarbon chains having up to 30 carbon atoms which may be substituted by ether groups, ester groups, amide groups or amidine groups and may also be terminated by isocyanate-reactive groups,

R_4 corresponds to the definition or R_1, R_2 and R_3, but may additionally represent an aromatic substituent having 6 to 15 carbon atoms or may represent the group $—NR_2R_3$, with the proviso that when R_4 represents the group $—NR_2R_3$,

R_1 can be hydrogen, and

wherein R_1, R_2, R_3 and R_4, may, with one or both of the amidine nitrogens, form a heterocyclic ring, and

(ii) a member selected from the group consisting of phenolic hydroxyl group containing compounds and aliphatic carboxylic acids, in an amount sufficient to solubilize the zinc carboxylate.

4,886,839

MINERAL FILLER FIRE RETARDANT COMPOSITOIN AND METHOD

Anthony J. Dallavia, Jr.; Susan Vande Ven, both of Marietta, and Bobby E. Smith, Ranger, all of Ga., assignors to J. M. Huber Corporation, Rumson, N.J.

Filed Aug. 24, 1988, Ser. No. 236,064
Int. Cl.[4] C08J 9/04
U.S. Cl. 521—124 7 Claims

1. A method for forming a particulate flame retardant composition comprising:

forming an alumina trihydrate particulate mineral filler, said mineral filler having basic alkali metal salt sites on the surface of the filler;

admixing said mineral filler with a polyfunctional isocyanate,

admixing said polyfunctional isocyanate and said mineral filler for a period of time sufficient for the basic sites to initiate polymerization of said polyfunctional isocyanate to form a polymeric material substantially coating the basic sites.

4,886,840

DILUENT FOR UV AND EB CURABLE RESINS

Hideaki Mukohyama, Yatsushiro; Hiroshi Oka, Kawasaki, and Kenji Shibusawa, Urawa, all of Japan, assignors to Kohjin Co., Ltd., Tokyo, Japan

Filed Jan. 5, 1987, Ser. No. 360
Claims priority, application Japan, Feb. 27, 1986, 61-40235
Int. Cl.[4] C08F 283/00
U.S. Cl. 522—96 8 Claims

1. A resin composition curable by irradiation with ultraviolet rays or electron beams, which comprises a photopolymerizable prepolymer and 5 to 50 parts by weight per 100 parts by weight of said prepolymer, of a compound of the formula wherein R is hydrogen atom or methyl group, said prepolymer being a (meth)acrylate prepolymer having a viscosity of more than 2,000 cps.

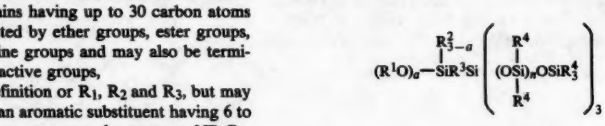
4,886,841

ULTRAVIOLET-CURABLE GEL COMPOSITION

Yoshinori Hida, and Seizi Katayama, both of Annaka, Japan, assignors to Shin-Etsu Chemical Co., Ltd., Tokyo, Japan

Filed Jan. 28, 1988, Ser. No. 149,599
Claims priority, application Japan, Jan. 28, 1987, 62-18028
Int. Cl.[4] C08F 283/12; C08G 77/04, 77/38; C08L 83/14
U.S. Cl. 522—99 3 Claims

1. An ultraviolet-curable gel composition which comprises an organopolysiloxane as a principal component which is represented by the general structural formula below.



where R^1 is a monovalent organic group having 4 to 25 carbon atoms and containing therein 1 to 2 vinyl functional groups; R^2 is a monovalent organic group having 1 to 18 carbon atoms and having no vinyl group capable of addition polymerization; R^3 is a divalent hydrocarbon group having 2 to 4 carbon atoms; R^4 is a substituted or unsubstituted hydrocarbon group having 1 to 9 carbon atoms of the same or different kind; a is an integer of 1 to 3; and n is an integer of 5 to 500.

4,886,842

EPOXY-AMINE COMPOSITIONS EMPLOYING UNSATURATED IMIDES

Kieran F. Drain, Rochester Hills, Mich., and Kris Kadziela, East Hartford, Conn., assignors to Loctite Corporation, Newington, Conn.

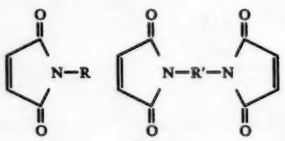
Division of Ser. No. 164,075, Mar. 4, 1988, Pat. No. 4,837,295.
This application Jan. 6, 1989, Ser. No. 295,068
Int. Cl.[4] C08G 59/60
U.S. Cl. 522—103 10 Claims

1. A composition comprising:

(1) a compound of mixture of compounds having a plurality of epoxy groups per molecule;

(2) a polyoxyalkylene amine curative for the epoxy;

(3) an imide compound selected from those having the formulas:



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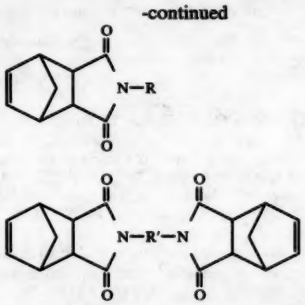


wherein R and R' are, respectively, monovalent and divalent organic groups having 200 or fewer carbon atoms; and

(4) a photocurable ethylenically unsaturated compound and a photoinitiator, said ethylenically unsaturated compound and photoinitiator present in amounts which together are effective to cause the composition to become immobilized when irradiated with actinic radiation.

4,886,843

DUAL-CURE CEMENT

Ian G. Walton, Congleton, United Kingdom, assignor to Imperial Chemical Industries Plc, London, England

Filed Jan. 25, 1988, Ser. No. 147,866

Claims priority, application United Kingdom, Feb. 6, 1987, 8702716

Int. Cl.[4] C08F *2/50*; C08G *79/00*; C08J *3/28*

U.S. Cl. 522—174 **8 Claims**

1. A dental cement composition having a first component which comprises an ethylenically polymerisable compound which contains both a salicylate group and at least one acrylate, alkacrylate, acrylamide or alkacrylamide group (hereinafter referred to as an acrylosalicylate), and a second component which comprises a calcium hydroxide or a suitable precursor to calcium hydroxide, and a photosensitive catalyst the ingredients of which may be present in either or both of the first and second components.

4,886,844

POLYAMIDE RESIN DISPERSIONS AND METHOD FOR THE MANUFACTURE THEREOF

Michael E. Hayes, Fernandina Beach, Fla., assignor to Union Camp Corporation, Wayne, N.J.

Filed Feb. 3, 1988, Ser. No. 151,733

Int. Cl.[4] C08K *7/16*

U.S. Cl. 523—223 **9 Claims**

1. A method for the preparation of a stable aqueous dispersion of a non-solvated, un-neutralized, low acid number, low amine number, polymerized fatty acid polyamide resin, said method comprising the steps of:

(a) heating the polyamide resin to at least the melting point thereof, thereby liquifying the polyamide resin

(b) providing a cationic surfactant which is the salt of the amine of the formula:

$$R—NH—CH_2)_{n1}\ (NH—CH_2)_{n2}\ )_{n3}NH_2$$

wherein R represents an alkyl having 16–20 carbon atoms and n_1 and n_2 are the same or different and each represents a whole number from 1–3 and n_3 is 0 or 1.

(c) mixing the liquified polyamide resin, an amount of the surfactant which is effective in forming an emulsion of the liquified polyamide resin in water and stabilizing a dispersion of solidified particles of the polyamide resin in water, and a predetermined amount of water having a predetermined temperature, said predetermined amount of water being selected so that the resulting mixture contains from about 20 percent to about 60 percent by weight of the polyamide resin and said predetermined temperature being selected so that the resulting mixture has a temperature which is at least as high as the melting temperature of the polyamide resin.

(d) subjecting the mixture of the polyamide resin, surfactant and water to comminuting forces sufficient to cause the formation of an emulsion containing droplets of the liquified polyamide resin in the water having a volume average size distribution which is less than 20 microns and

(e) cooling the emulsion to a temperature which is less than the melting temperature of the polyamide resin

whereby the polyamide resin solidifies as finely divided particles in a water phase to thereby form a stable aqueous dispersion of the polyamide resin.

4,886,845

STABLE AQUEOUS EPOXY RESIN DISPERSION, PROCESS FOR THE PREPARATION THEREOF AND USE THEREOF

Wilhelm Becker, Hamburg, and Claus Godau, Kiedrich, both of Fed. Rep. of Germany, assignors to Hoechst AG, Fed. Rep. of Germany

Filed Dec. 18, 1987, Ser. No. 134,792

Claims priority, application Fed. Rep. of Germany, Dec. 20, 1986, 3643751

Int. Cl.[4] C08L *63/00*

U.S. Cl. 523—403 **26 Claims**

1. An aqueous dispersion comprising a self-emulsifying epoxy resin (A), wherein the self-emulsifying epoxy resin (A) has an epoxy equivalent of between 250 and 10,000 and a mean particle size of 0.25 to 1.0 μm and is a condensation product of

(a) 50 to 80% by weight of an epoxy compound containing at least two epoxy groups per molecule and having an epoxy equivalent of 100 to 2,000,

(b) 35 to 17% by weight of an polyhydric phenol and

(c) 15 to 3% by weight of a condensation product of an aliphatic polyol with a mean molecular weight (Mw) of 200 to 20,000 and an epoxy compound containing at least two epoxy groups per molecule and having an epoxy equivalent of 100 to 2,000, the equivalent ratio of the OH groups to the epoxy groups being 1:0.95 to 1:3.5 and the epoxy equivalent of said condensation product being between 200 and at least 50,000.

4,886,846

AROMATIC DIOLEFINIC COMPOUNDS, AROMATIC DIETHYL COMPOUNDS AND ELECTROPHOTOGRAPHIC PHOTOCONDUCTORS COMPRISING ONE AROMATIC DIETHYL COMPOUND

Tomoyuki Shimada, Numazu; Masaomi Sasaki, Susono, and Mitsuru Hashimoto, Numazu, all of Japan, assignors to Ricoh Company, Ltd., Tokyo, Japan

Filed Mar. 21, 1988, Ser. No. 171,422

Claims priority, application Japan, Mar. 28, 1987, 62-77105; Apr. 21, 1987, 62-98393; Apr. 21, 1987, 62-98394; Jun. 9, 1987, 62-142178; Oct. 20, 1987, 62-266068; Oct. 27, 1987, 62-272783

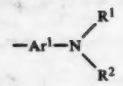
Int. Cl.[4] C08L *63/00*; C08K *5/36, 5/34, 5/01*

U.S. Cl. 523—453 **3 Claims**

1. A charge transporting medium comprising an aromatic diethyl compound having formula (II-I) and a binder agent:

$$A—CH_2CH_2—Ar—CH_2CH_2—A \qquad \text{(II-I)}$$

wherein A represents an N-substituted carbazolyl group or



wherein Ar^1 represents an unsubstituted or substituted aromatic hydrocarbon group or a heterocyclic group, and R^1 and R^2 each represent an unsubstituted or substituted alkyl group or an unsubstituted or substituted aryl group; and Ar represents an unsubstituted or substituted aromatic hydrocarbon group.

4,886,847

FAST-CRYSTALLIZING POLYESTER COMPOSITIONS

Catia Bastioli; Vittorio Bellotti, both of Novara, and Luciano Del Giudice, Milan, all of Italy, assignors to Montefibre S.p.A., Milan, Italy

Filed Jun. 13, 1988, Ser. No. 205,956
Claims priority, application Italy, Jun. 16, 1987, 20910 A/87
Int. Cl.[4] C08K *5/45, 5/34, 5/15;* C08L *67/02*
U.S. Cl. 524—84 13 Claims

1. Fast-crystallizing polyester compositions comprising a mixture consisting essentially of a thermoplastic polyester resin and a nucleating agent, characterized in that the nucleating agent is selected from the group consisting of salts, or mixtures of salts, of organic acids of the formula:

(I)

wherein:

R is an aromatic radical having from 6 to 18 carbon atoms, a cycloaliphatic radical having from 3 to 18 carbon atoms, a heterocyclic radical having from 4 to 18 carbon atoms and N, O or S as heteroatom, or an aromatic, cycloaliphatic or heterocyclic radical as defined above wherein one or more hydrogen atoms are substituted by a hydroxyl group, a halogen radical, an alkyl radical or an alkyl-oxy radical having from 1 to 4 carbon atoms, a nitro radical, an aryl radical or an aryl-oxy radical having from 6 to 18 carbon atoms, an alkylene-aryl radical having from 1 to 4 carbon atoms in the alkylene chain and from 6 to 18 carbon atoms in the aryl radical, an aryl-sulfone, aryl-sulfoxide, aryl-ketone, aryl-thioketone, aryl-thio-phenoxy, or aryl-imine radical having from 6 to 18 carbon atoms in the aryl chain;

R_1 and R_2, which may be the same or different, may be hydrogen or an alkyl radical having from 1 to 4 carbon atoms;

Me is an alkali or alkaline-earth metal; and

n is zero or an integer from 1 to 3.

4,886,848

FLAME RETARDANT THERMOPLASTIC POLYURETHANE RESIN COMPOSITION

Hidemi Nishiyama, Chigasaki, and Kenichi Ohtani, Hiratsuka, both of Japan, assignors to The Furukawa Electric Co., Ltd., Tokyo, Japan

Filed Nov. 27, 1987, Ser. No. 126,000
Claims priority, application Japan, Dec. 2, 1986, 61-287197
Int. Cl.[4] C08K *5/15*
U.S. Cl. 524—109 19 Claims

1. A flame retardant thermoplastic polyurethane composition comprising a thermoplastic polyurethane resin or a thermoplastic resin containing a thermoplastic polyurethane resin as a major constituent thereof; a halogen flame retardant; and from 0.2 to 20 parts by weight of a compound having a cyclohexene oxide group per 100 parts by weight of said thermoplastic polyurethane resin or said thermoplastic resin containing said thermoplastic polyurethane resin as a major constituent thereof.

4,886,849

BUTENE-1 MOLDING RESIN BLENDS

Charles C. Hwo, Sugar Land, Tex., and Patrick M. Hughes, Clinton, N.J., assignors to Shell Oil Company, Houston, Tex.

Continuation-in-part of Ser. No. 161,872, Feb. 29, 1988, abandoned. This application Feb. 27, 1989, Ser. No. 316,387
Int. Cl.[4] C08L *23/18, 23/12, 23/06;* C08K *5/00*
U.S. Cl. 524—263 33 Claims

1. A composition consisting essentially of a blend of about 60 to 75% by weight of an isotactic butene-1 homopolymer with a melt index of more than 100 to 1000, about 23.5 to 39.88% by weight of stabilized propylene polymer, and about 0.02 to 1.5% by weight of high density polyethylene.

4,886,850

RUBBER COMPOSITIONS AND PNEUMATIC TIRES USING THE SAME

Masaki Ogawa; Yasuro Shiomura, and Toshiki Takizawa, all of Kodaira, Japan, assignors to Bridgestone Corporation, Tokyo, Japan

Division of Ser. No. 46,352, May 6, 1987, Pat. No. 4,801,641. This application Aug. 31, 1988, Ser. No. 238,673
Claims priority, application Japan, Jun. 17, 1986, 61-139287
Int. Cl.[4] C08K *3/04, 3/26;* C08L *9/00, 23/16*
U.S. Cl. 524—413 22 Claims

1. A pneumatic tire comprising a tread, sidewalls and bead portions; said sidewall being constructed by using a rubber composition comprising not less than 20 parts by weight of a rubber consisting essentially of an interpolymer of ethylene, propylene and diene and satisfying all of the following requirements:

(1) a glass transition temperature of not higher than −50° C. as measured by a differential scanning calorimeter;

(2) an iodine value of 10~34;

(3) a weight-average molecular weight of not less than 220,000;

(4) an ethylene content of 68~85 mol %;

(5) a molecular weight distribution ($\overline{M}w/\overline{M}n$) of not less than 3.0;

(6) $95 \leqq 1.5 \times$(iodine value)+(ethylene content)$\leqq 120$; and

(7) $90 \leqq$(weight-average molecular weight)$\times 10^{-4}+$(ethylene content)$\leqq 110$

, not less than 10 parts by weight of an isoprene rubber, not less than 10 parts by weight of a process oil and 20~100 parts by weight of an inorganic filler based on 100 parts by weight of rubber content.

12. A pneumatic tire comprising a tread, sidewalls and bead portions; said tread being constructed by using a rubber composition comprising not less than 20 parts by weight of an interpolymer of a rubber composed mainly of ethylene, propylene and diene and satisfying all of the following requirements:

(1) a glass transition temperature of not higher than −50° C. as measured by a differential scanning calorimeter;

(2) an iodine value of 10~34;

(3) a weight-average molecular weight of not less than 220,000;

(4) an ethylene content of 68~85 mol %;

(5) a molecular weight distribution ($\overline{M}w/\overline{M}n$) of not less than 3.0;

(6) $95 \leqq 1.5 \times$(iodine value)+(ethylene content)$\leqq 120$; and

(7) $90 \leqq$(weight-average molecular weight)$\times 10^{-4}+$(ethylene content)$\leqq 110$

, not less than 10 parts by weight of a process oil and 50~150 parts by weight of an inorganic filler based on 100 parts by weight of rubber content.

4,886,851
POLYACETAL RESIN COMPOSITION

Yukio Ikenaga, and Masami Yamawaki, both of Fuji, Japan, assignors to Polyplastics Company, Ltd., Osaka, Japan

Filed Feb. 14, 1986, Ser. No. 830,022
Claims priority, application Japan, Feb. 4, 1985, 60-19766
Int. Cl.[4] C08L 59/00, 51/04; C08K 3/26
U.S. Cl. 524—425 3 Claims

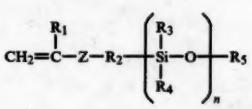
1. A polyacetal resin molding composition which comprises 99.5 to 50 percent by weight of a polyacetal homopolymer or copolymer, 0.5 to 50 percent by weight of a multi-stage polyacrylate having an elastomeric first stage and a thermoplastic rigid final stage and an inorganic substance selected from the group consisting of calcium carbonate, glass, silica, talc and pumice.

4,886,852
PROCESS FOR PREPARING AN AQUEOUS DISPERSION

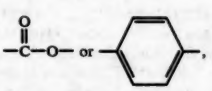
Nobushige Numa, Ebina, Japan, assignor to Kansai Paint Company, Limited, Amagasaki, Japan

Filed Oct. 7, 1988, Ser. No. 254,625
Claims priority, application Japan, Oct. 12, 1987, 62-257930
Int. Cl.[4] C08F 2/16
U.S. Cl. 524—458 9 Claims

1. A process for preparing an aqueous dispersion, comprising the steps of (i) preparing a nonaqueous dispersion of polymer particles by polymerizing a radically polymerizable unsaturated monomer, (A) in an organic solvent, in which the polymer particles prepared from unsaturated monomer (A) are insoluble, in the presence of a dispersion stabilizer resin comprising a copolymer prepared by copolymerizing an alkoxysilane group-containing vinyl monomer represented by the formula



wherein Z is a group



R_1 is a hydrogen atom or methyl group, R_2 is a straight- or branched-chain alkylene group having 1 to 6 carbon atoms, R_3 and R_4 are the same or different and each represent a phenyl group, straight- or branched-chain alkyl group having 1 to 6 carbon atoms or straight- or branched-chain alkoxy group having 1 to 10 carbon atoms, R_5 is a straight- or branched-chain alkyl group having 1 to 10 carbon atoms, and n is an integer of 1 to 10, with a carboxyl group-containing unsaturated monomer and a polymerizable monomer (B); the unsaturated monomer (A) being at least one monomer selected from the group consisting of C_1–C_{18} alkyl esters or C_1–C_{18} cycloalkyl esters of acrylic or methacrylic acids, alkoxyalkyl esters of acrylic or methacrylic acids, hydroxyalkyl esters of acrylic or methacrylic acids, esters of aromatic alcohol with acrylic or methacrylic acid, addition products of glycidyl acrylate, glycidyl methacrylate or hydroxyalkyl ester of acrylic or methacrylic acid with C_2–C_{18} monocarboxylic acid compound, addition products of acrylic or methacrylic acid with monoepoxy compound, vinyl aromatic compounds, mono- or di-esters of α, β-unsaturated carboxylic acids with mono-alcohol having 1 to 18 carbon atoms, acrylates or methacrylates having fluorine atom at the side chain, fluorine-containing unsaturated compounds, vinyl esters, vinyl ethers, α-olefin type compounds and cyano group-containing unsaturated compounds,

the carboxyl group-containing unsaturated monomer being at least one monomer selected from the group consisting of acrylic acid, methacrylic acid, crotonic acid, maleic acid, maleic anhydride, itaconic acid, itaconic anhydride, fumaric acid and citraconic acid, and

the polymerizable monomer (B) being at least one monomer selected from the group consisting of C_1–C_{18} alkl esters or C_1–C_{18} cycloalkyl esters of acrylic or methacrylic acids, alkoxyalkyl esters of acrylic or methacrylic acids, hydroxyalkyl esters of acrylic or methacrylic acids, esters of aromatic alcohol with acrylic or methacrylic acid, addition products of glycidyl acrylate, glycidyl methacrylate or hydroxyalkyl ester of acrylic or methacrylic acid with C_2–C_{18} monocarboxylic acid ccmpound, addition products of acrylic or methacrylic acid with monoepoxy compound, vinyl aromatic compounds, mono- or di-esters of α, β-unsaturated carboxylic acids with mono-alcohol having 1 to 18 carbon atoms, acrylates or methacrylates having fluorine atom at the side chain, fluorine-containing unsaturated compounds, vinyl esters, vinyl ethers, α-olefin type compounds; and (ii) converting the nonaqueous dispersion to an aqueous dispersion.

4,886,853
HOT-MELT ADHESIVE COMPOSITION

Bruce W. Foster; Clyde N. Clubb, and Richard K. Stuart, Jr., all of Longview, Tex., assignors to Eastman Kodak Company, Rochester, N.Y.

Continuation-in-part of Ser. No. 126,439, Nov. 30, 1987, abandoned. This application Feb. 23, 1989, Ser. No. 314,626
Int. Cl.[4] C08K 5/01; C09J 3/14
U.S. Cl. 524—477 20 Claims

1. A hot-melt adhesive composition having a melt viscosity of about 3,000 to about 25,000 centipoise at 135° C., a cone penetration value as measured by ASTM Procedure D-1403 of at least 10 dmm, and a Ring and Ball softening point of about 90° C. to about 125° C., said composition comprising a blend of:

(a) at least one substantially amorphous propylene/hexene copolymer having an acid number of less than about 0.5,

(b) at least one tackifier, and

(c) at least one substantially crystalline, low viscosity hydrocarbon wax containing substantially no propylene and having a melt viscosity of from about 3 to about 4,000 centipoise at 150° C. and a melting point of from about 90° C. to about 125° C.,

the concentrations of components (a), (b), and (c) being such that said adhesive composition has elastic delamination resistance of at least about 4 hours wherein elastic delamination resistance is the length of time a polyethylene to elastic bond can withstand the stress of elastic relaxation at body temperature.

4,886,854
SUBSTITUTE FOR AMINO AND PHENOLIC RESINS

Efthalia V. Markessini, Salonica, Greece, and Andrew C. Markessini, Bad Munder, Fed. Rep. of Germany, assignors to ENIGMA, NV, Curacao, Netherlands Antilles

Filed Jun. 5, 1987, Ser. No. 58,905
Claims priority, application United Kingdom, Jun. 6, 1986, 8613791; Jan. 23, 1987, 8701518; Apr. 28, 1987, 8710016
Int. Cl.[4] C08L 97/02; B29J 5/00
U.S. Cl. 524—14 6 Claims

1. A lignocellulosic product comprising in combination:

(a) a bonding composition consisting essentially of:

(1) a bonding resin; and

(2) a resin substitute comprising an aqueous solution of:

(i) at least one aldehyde selected from the group consisting of formaldehyde and acetaldehyde;

(ii) at least one amide selected from the group consisting

of urea, thiourea, melamine, benzoguanamine and dicyandiamide; and

(iii) at least one carbohydrate member, selected from the group consisting of molasses, dextrose, glucose, fructose, sucrose, corn syrup, wheat starch, modified starch, dextrin, and their derivatives,

wherein the ratio by weight of said aldehyde to said amide is 0.2 to 1:1; and

(b) a lignocellulosic substrate.

4,886,855

POLYMER BLENDS OF POLYCARBONATE STYRENE TERPOLYMER AND ABS RESIN

Charles F. Parsons, Little Hocking, Ohio, assignor to Borg-Warner Chemicals, Inc., Parkersburg, W. Va.

Filed Mar. 8, 1988, Ser. No. 165,462

Int. Cl.[4] C08L *69/00, 55/02, 31/02, 35/06*

U.S. Cl. 525—67 **7 Claims**

1. A polymer blend composition, comprising:

(a) from about 15 to about 65 weight percent polycarbonate;

(b) from about 25 to about 75 weight percent of a styrene-acrylonitrile-maleic anhydride terpolymer, said terpolymer comprising from about 7 to about 20 weight percent acrylonitrile and not less than about 4 weight percent maleic anhydride; and

(c) from about 4 to less than 20 weight percent of an ABS resin, based on the total weight of the polycarbonate, the terpolymer and the ABS resin, the ABS resin comprising a rigid graft polymer grafted to a diene rubber substrate and containing at least 40 weight percent of the diene rubber substrate.

4,886,856

FUNCTIONALIZED ELASTOMERS BLENDED WITH POLAR COPOLYMERS OF STYRENE AND ACRYLIC ACID METHACRYLIC ACID OR MALEIC ANHYDRIDE

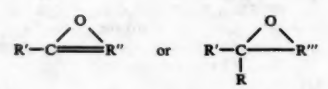
Bibiana S. Y. Chen, and David E. Henton, both of Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.

Division of Ser. No. 899,173, Aug. 21, 1986, abandoned. This application Nov. 27, 1987, Ser. No. 125,791

Int. Cl.[4] C08L *25/08;* **C08F** *255/06, 279/02*

U.S. Cl. 525—73 **12 Claims**

1. A thermoplastic polymer blend comprising a polar matrix copolymer which is a copolymer of styrene and acrylic acid, methacrylic acid or maleic anhydride and a graft copolymer elastomer comprising a rubbery substrate polymer (I) having grafted thereto a copolymer (II) comprising the reaction product of a first monomer selected from the group consisting of monovinylidene aromatic monomers, ethylenically unsaturated nitrile functional monomrs, ethylenicaly unsaturated carboxylic acid esters having 1 to 4 carbons in the ester group, and mixtures thereof and from 0.1 to 10 percent by weight of a copolymerizable comonomer containing pendant cyclic ether or cyclic iminoether functionality corresponding to the formulae:



wherein R′ is an ethylenically unsaturated addition polymerizable aliphatic radical of up to 8 carbons; R″ is a trivalent aliphatic moiety of up to 12 carbons; R‴ is a divalent aliphatic moiety of up to 12 carbons; and R is hydrogen, halogen or a C_{1-4} alkyl group, said percentages being based on total first monomers and copolymerizable comonomer weight.

4,886,857

STYRENE BASED RESIN COMPOSITION

Masanori Ota; Fumio Akutsu, and Kazuo Takahashi, all of Iwaki, Japan, assignors to Kureha Kagaku Kogyo K. K., Tokyo, Japan

Filed Mar. 21, 1988, Ser. No. 171,031

Claims priority, application Japan, Mar. 25, 1987, 62-069130

Int. Cl.[4] C08L *25/04, 51/04*

U.S. Cl. 525—74 **3 Claims**

1. A styrene based resin composition comprising:

(I) 100 parts by weight of a styrene resin; and

(II) 1–100 parts by weight of a graft copolymer obtained by graft-polymerizing, in the presence of (A) 50–80 parts by weight of a rubbery polymer obtained from butadiene or a mixture of at least 50 wt. % of butadiene and less than 50 wt. % of at least one monomer which is other than butadiene and is copolymerizable with butadiene, said rubbery polymer comprising a latex having an average particle size of 0.08 to 0.8 μm, (B) 50–20 parts by weight of a monomer mixture composed of (B-1) 0.5–45 wt. % of a monomer containing 1–50 ethylene oxide groups and one ethylenically-unsaturated bond and (B-2) 99.5–55 wt. % of styrene or a monomer mixture composed of at least 55 wt. % of styrene and less than 45 wt. % of at least one monomer which is other than styrene and is copolymerizable with styrene, the sum of said rubbery polymer (A) and said monomer mixture (B) being 100 parts by weight.

4,886,858

THERMOSETTING RESIN AND PREPREG AND LAMINATE USING THE SAME

Junichi Katagiri, Ibaraki; Akira Nagai; Keiko Tawara, both of Hitachi; Akio Takahashi, Hitachiota; Motoyo Wajima, Hitachi; Toshikazu Narahara, Ibaraki, and Ryo Hiraga, Hitachiota, all of Japan, assignors to Hitachi, Ltd., Toyota, Japan

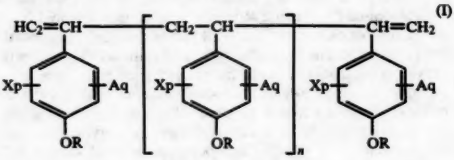
Filed Feb. 17, 1987, Ser. No. 15,325

Claims priority, application Japan, Feb. 19, 1986, 61-33050; Apr. 16, 1986, 61-85966

Int. Cl.[4] C08F *12/08, 12/12, 265/02*

U.S. Cl. 525—301 **6 Claims**

1. A thermosetting poly(p-hydroxystyrene) derivative resin represented by the formula:



(I)

wherein A is an alkyl group; X is a halogen group; R is an alkenyl or alkenoyl group having 2 to 4 carbon atoms; p is an integer of 1 to 4; q is zero or an integer of 1 to 4; and n is an integer of 1 to 100.

4,886,859

SLIGHTLY CROSSLINKED, WATER-SOLUBLE POLYMALEIC ACID, ITS PREPARATION AND ITS USE

Walter Denzinger, Speyer; Heinrich Hartmann, Limburgerhof; Ulrich Göckel, Boehl-Iggelheim; Felix Richter, Bruehl; Hans-Jürgen Raubenheimer, Ketsch, and Ekhard Winkler, Mutterstadt, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Continuation of Ser. No. 94,766, Sep. 10, 1987, abandoned. This application Oct. 27, 1988, Ser. No. 263,561

Claims priority, application Fed. Rep. of Germany, Sep. 19, 1986, 3631814

The portion of the term of this patent subsequent to Apr. 4, 2006, has been disclaimed.

Int. Cl.[4] C08F 8/12

U.S. Cl. 525—327.8 13 Claims

1. A process for preparing crosslinked, water-soluble polymaleic acid, containing less than one percent by weight, based on the solids content, of unpolymerized maleic anhydride or its corresponding acid, wherein maleic anhydride is polymerized with from 0.1 to 10% by weight, based on maleic anhydride, of a crosslinking agent containing 2 or more ethylenically unsaturated double bonds in an aromatic hydrocarbon at from 60° to 200° C., in the presence of from 1 to 20% by weight, based on maleic anhydride, of a peroxyester initiator derived from a saturated or ethylenically unsaturated carboxylic acid, and then hydrolyzing the polymer.

4,886,860

POLYMETALOSILAZANE AND PROCESS FOR PREPARING SAME

Mikiro Arai; Osamu Funayama; Yuuji Tashiro, all of Saitama, and Takeshi Isoda, Niiza, all of Japan, assignors to Toa Nenryo Kogyo Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 172,019, Mar. 23, 1988, abandoned. This application Mar. 17, 1989, Ser. No. 326,399

Int. Cl.[4] C08F 283/00

U.S. Cl. 525—474 29 Claims

1. A novel polymetalosilazane having a metal/silicon atomic ratio of 0.001 to 3 and a number average molecular weight of about 200 to about 500,000, which is obtained by reacting a polysilazane having a number average molecular weight of about 100 to about 50,000, which has a main skeleton consisting substantially of units represented by the following general formula (I):

(I)

wherein each R^1, R^2 and R^3 is independently selected from the group consisting of a hydrogen atom, an alkyl group, an alkenyl group, a cycloalkyl group, an aryl group, a group other than the above-mentioned groups in which the atom bonded directly to the silicon atom is a carbon atom, an alkylsilyl group, an alkylamino group and an alkoxy group, with the proviso that at least one of R^1, R^2 and R^3 is a hydrogen atom, with a metal alkoxide represented by the following general formula (II):

$$M(OR^4)_n \quad (II)$$

wherein M stands for at least one metal selected from the group consisting of metals of groups IIA and III through V of the Periodic Table, R^4's which may be the same or different stand for a hydrogen atom or an alkyl group having 1 to 20 carbon atoms or aryl group, with the proviso that at least one of R^4's is the above-mentioned alkyl group or aryl group, and n stands for the valency of the metal M.

4,886,861

MOLECULAR WEIGHT CONTROL IN FREE RADICAL POLYMERIZATIONS

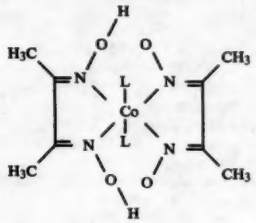
Andrew H. Janowicz, Wilmington, Del., assignor to E. I. Du-Pont de Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. No. 726,238, Apr. 23, 1985. This application Apr. 16, 1987, Ser. No. 39,092

Int. Cl.[4] C08F 2/38, 20/18

U.S. Cl. 526—145 13 Claims

1. In an improved free radical polymerization of acrylic and/or styrene monomers wherein molecular weight control is effected by means of a catalytic chain transfer agent, the improvement characterized in that the polymerization is initiated by an azo initiator and carried out either in the presence of at least one solvent selected from the group consisting of methanol, ethanol, propanol and butanol, or in the absence of any solvent and further in the presence of a Lewis base in admixture with a catalytic chain transfer agent which is the cobalt chelate of the formula



(IV)

L is

H_2O or $(C_6H_5)_3P$]; the Lewis base being of the formula $R^4R^5R^6P$ wherein each of R^4, R^5 and R^6, independently, is phenyl optionally substituted with 1 to 4 substituents selected from $—R^3$, $—OR^3$, $—N(R^3)_2$, —F, —Cl, —Br, —I, $—NO_2$, —COOH, $—COOR^3$, —CHO and $—C(O)R^3$ wherein R^3 is $C_{1\text{-}10}$ alkyl or $C_{5\text{-}10}$ cycloalkyl, provided, however, only one ortho position in each phenyl group is substituted, and provided further, if all three phenyl groups are substituted in the ortho positions, the substituent is —F or $—CH_3$; said Lewis base being in an amount such that the molar ratio of base to cobalt chelate is greater than 2:1, but less than or equal to 250:1.

4,886,862

RESIN COMPOSITION

Shinichi Kuwamura, Izumi-ohtsu, and Masataka Ooka, Nara, both of Japan, assignors to Dainippon Ink and Chemicals, Inc., Tokyo, Japan

Continuation of Ser. No. 916,330, Oct. 7, 1986, abandoned. This application Dec. 12, 1988, Ser. No. 282,907

Claims priority, application Japan, Oct. 9, 1985, 60-223479

Int. Cl.[4] C08F 16/24

U.S. Cl. 526—247 31 Claims

1. An ordinary temperature-curable resin composition comprising

(A) a hydrolyzable silyl group-containing copolymer obtained by polymerizing a monomeric mixture comprising (i) a fluoroalkyl perfluorovinyl ether having 1 to 8 carbon atoms in the alkyl moiety, a perfluoroalkyl perfluorovinyl ether having 1 to 8 carbon atoms in the alkyl moiety or a mixture thereof and (ii) a vinyl ester of a carboxylic acid,

as essential components in the presence of (iii) a hydrolyzable silyl group-containing compound,
(B) a curing catalyst, and
(C) an organic solvent.

4,886,863

NOVEL ALKENYLPHENOL DERIVATIVES

Pen C. Wang, Houston, Tex., assignor to Shell Oil Company, Houston, Tex.

Filed Feb. 23, 1989, Ser. No. 314,520
Int. Cl.[4] C08F *22/40*
U.S. Cl. 526—262 11 Claims

1. The cured product obtained by heating an ortho-alkenyl hydroxyaryl-substituted 1,6-diaza [4.4] spirodilactam having a hydroxyaryl-containing substituent located on each spiro ring nitrogen atom and at least one 2-alkenyl group substituted on an aryl ring carbon atom located ortho to the hydroxyl group of the hydroxyaryl substituent at a temperature from about 150° C. to about 250° C. with a polyfunctional curing agent.

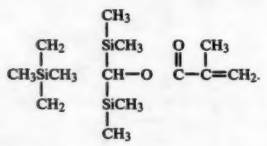
4,886,864

SILYMETHYLENE METHACRYLATE CONTACT LENS AND POLYMER

William M. Foley, Jr., Glendale, Calif., assignor to John D. McCarry, Santa Ana, Calif.

Division of Ser. No. 61,477, Jun. 1, 1985, Pat. No. 4,780,516, Continuation-in-part of Ser. No. 742,122, Jun. 5, 1985, abandoned, Continuation-in-part of Ser. No. 641,594, Aug. 17, 1984, abandoned. This application Sep. 19, 1988, Ser. No. 246,419
Int. Cl.[4] C08F *26/10*
U.S. Cl. 526—264 8 Claims

1. A contact lens comprising polymer resulting from the polymerization or copolymerization of silylmethylenes, having the general structure



4,886,865

ORGANOPOLYSILOXANE COMPOSITION

Masayuki Ikeno, Annaka; Hironao Fujiki, and Hiroshi Inomata, both of Takasaki, all of Japan, assignors to Shin-Etsu Chemical Co., Ltd., Tokyo, Japan

Filed Mar. 18, 1988, Ser. No. 169,849
Claims priority, application Japan, Mar. 24, 1987, 62-69594
Int. Cl.[4] C08G *77/06*
U.S. Cl. 528—15 3 Claims

1. An organopolysiloxane composition which comprises, in admixture:
(A) an organopolysiloxane composed of:
(i) from 80 to 97.5% by moles of diorganosiloxane units represented by the general unit formula R_2SiO, in which R is a substituted or unsubstituted monovalent hydrocarbon group free from aliphatic unsaturation,
(ii) from 1.2 to 10% by moles of silethylene-containing units expressed by the unit formula $OSiMe—CH_2C-H_2—SiMe_2O_{0.5}$, in which Me is a methyl group,
(iii) from 1.2 to 10% by moles of trimethyl siloxy units expressed by the unit formula $Me_3SiO_{0.5}$, in which Me is a methyl group, and
(iv) from 0.1 to 4.0% by moles of dimethyl vinyl siloxy units expressed by the unit formula $Me_2ViSiO_{0.5}$, in which Me is a methyl group and Vi is a vinyl group;
(B) an organohydrogenpolysiloxane having, in a molecule, at least one siloxane unit represented by the unit formula

$$R_aH_bSiO_{(4-a-b)/2},$$

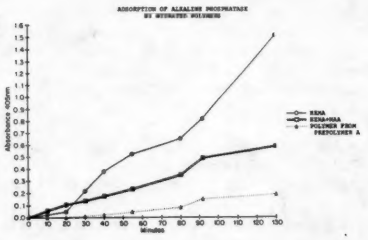
in which R has the same meaning as defined above, the subscript a is 0, 1 or 2 and the subscript b is 1 or 2 with the proviso that a+b=1, 2 or 3, in an amount sufficient to provide from 0.2 to 4 moles of hydrogen atoms directly bonded to the silicon atoms per mole of the vinyl groups bonded to the silicon atoms in the component (A);
(C) a noble metal compound in an amount sufficient to promote the addition reaction between the silicon-bonded vinyl groups in the component (A) and the silicon-bonded hydrogen atoms in the component (B).

4,886,866

CONTACT LENSES BASED ON BIOCOMPATIBLE POLYURETHANE AND POLYUREA-URETHANE HYDRATED POLYMERS

James A. Brastz, Rockville, and Clifton L. Kehr, Silver Spring, both of Md., assignors to W. R. Grace & Co.-Conn., New York, N.Y.

Continuation of Ser. No. 135,878, Dec. 21, 1987, abandoned, which is a continuation-in-part of Ser. No. 932,080, Nov. 18, 1986, abandoned, and Ser. No. 130,826, Dec. 9, 1987, abandoned. This application Feb. 16, 1989, Ser. No. 312,331
Int. Cl.[4] C08G *18/10*
U.S. Cl. 528—59 19 Claims



1. A hydrophilic, biocompatible contact lense comprising a hydrated polyurea-urethane polymer derived from prepolymer units at least 75% of which are oxyethylene-based diols or polyols having molecular weights of about 7000 to about 30,000, said diols or polyols having essentially all of the hydroxyl groups capped with polyisocyanate, said contact lens characterized by a non-ionic surface which resists nonspecific protein adsorption.

4,886,867

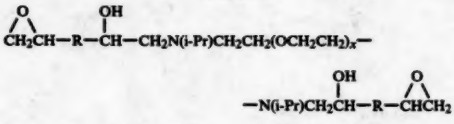
NOVEL COMPOSITIONS FROM POLYOXYALKYLENE AMINES AND EPOXIDES

Jiang-Jen Lin, Houston, and George P. Speranza, Austin, both of Tex., assignors to Texaco Chemical Company, White Plains, N.Y.

Filed Nov. 14, 1988, Ser. No. 270,898
Int. Cl.[4] C08G *59/02, 59/10*
U.S. Cl. 528—111 38 Claims

1. method for preparing a novel disfunctional epoxy resin which comprises reacting an excess of diepoxide with a secondary isopropylamine derivative of a polyoxyalkylene primary or triamine in the presence of acetone.

21. A difunctional epoxy resin composition useful in epoxy material applications having the formula:



consisting essentially of 0.5 to 1 mole of a secondary isopropyl amine derivative of a polyoxyalkylene primary diamine or triamine and 2 to 4 moles of a Bisphenol A diglycidyl ether, where R is from a Bisphenol A diglycidyl ether and x = from 2 to ≈10.

4,886,868

THERMOSETTING COMPOSITION FROM BIS-MALEIMIDE AND N-ALLYL OXY-PHENYL MALEIMIDE

Michel Rakoutz, deceased, late of Brignais, France (by Michelle Rakoutz, legal representative), assignor to Rhone-Poulenc Specialites Chimiques, Courbevoie, France

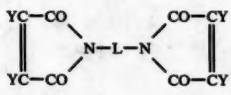
Division of Ser. No. 880,838, Jul. 1, 1986, Pat. No. 4,788,295. This application Jun. 24, 1988, Ser. No. 211,276

Claims priority, application France, Jul. 1, 1985, 85 10190; Apr. 17, 1986, 86 05744

Int. Cl.[4] C08G 73/12; C08F 22/04

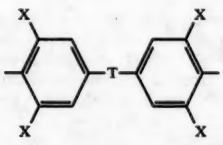
U.S. Cl. 528—170 16 Claims

1. A thermosetting composition of matter comprising (A) a prepolymer of (a) at least one bis-imide having the general formula (II):



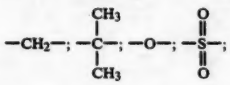
(II)

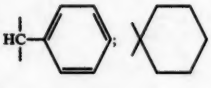
wherein Y is hydrogen or methyl; L is a divalent hydrocarbon radical or a radical having the formula (III):

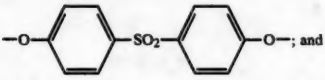


(III)

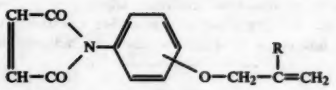
in which T is a valence bond or T represents one of the following:







X is hydrogen, methyl, ethyl or isopropyl, with (b) at least one monomaleimide having the following general formula (I):



(I)

wherein R is hydrogen or methyl; and (B) at least one imidazole compound.

4,886,869

THERMOTROPIC AROMATIC POLYESTER CARBONATES, A PROCESS FOR THEIR PREPARATION AND THEIR USE

Harald Pielartzik; Rolf Dhein; Rolf-Volker Meyer; Hans-Joachim Traenckner, all of Krefeld, and Edgar Ostlinning, Duesseldorf, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed Aug. 11, 1988, Ser. No. 231,138

Claims priority, application Fed. Rep. of Germany, Aug. 20, 1987, 3727729

Int. Cl.[4] C08G 63/64

U.S. Cl. 528—196 10 Claims

1. Thermotropic, fully aromatic polyester carbonate comprising

(a) substituted or unsubstituted aromatic hydroxycarboxylic acid units,

(b) diphenol units,

(c) carbonic acid units and

(d) aromatic dicarboxylic acid units, in which a proportion of the aromatic hydroxycarboxylic acid is present as substituted or unsubstituted 3-hydroxybenzoic acid units (e) and the molar ratios of (a) to (e) are as follows:

$a+b=1$

$b=c+d$

e/a=0.02–0.50,

$$\frac{c}{c+d} = 0.2\text{–}1;$$

in molar fractions:

a=0.3–0.95,
b=0.05–0.7,
c=0.05–0.30,
d=0–0.70
e=0.05–0.50.

4,886,870

BIOERODIBLE ARTICLES USEFUL AS IMPLANTS AND PROSTHESES HAVING PREDICTABLE DEGRADATION RATES

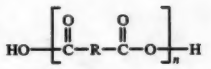
Patricia D'Amore, Brookline; Kam W. Leong, Cambridge, and Robert S. Langer, Somerville, all of Mass., assignors to Massachusetts Institute of Technology, Cambridge, Mass.

Continuation-in-part of Ser. No. 613,001, May 21, 1984, which is a continuation of Ser. No. 477,710, Mar. 22, 1983, abandoned. This application Feb. 15, 1985, Ser. No. 702,168

Int. Cl.[4] C08G 63/18, 63/60, 69/44

U.S. Cl. 528—206 7 Claims

1. An article useful for implantation or otherwise placed in or on the body, comprising a biocompatible, bioerodible, hydrophobic polyanhydride composition of the formula



wherein R is an organic group and n is at least 2, said polyan-

hydride being purified and characterized by biocompatibility that results in minimal tissue irritation when implanted in vasculated tissue and degrading at predictable, constant rates by hydrolysis into non-toxic residues after introduction in vivo.

4,886,871

MELT-STABLE POLY(ARYLENE THIOETHERKETONE) AND PRODUCTION PROCESS THEREOF

Yoshikatsu Satake; Takashi Kaneko; Yutaka Kobayashi; Yo Iizuka; Takayuki Katto, and Zenya Shiiki, all of Iwaki, Japan, assignors to Kureha Kagaku Kogyo K. K., Tokyo, Japan

Division of Ser. No. 194,012, May 12, 1988. This application May 19, 1989, Ser. No. 354,322

Claims priority, application Japan, May 15, 1987, 62-118619; May 7, 1988, 63-109916

Int. Cl.[4] C08G *2/00*

U.S. Cl. 528—226 **11 Claims**

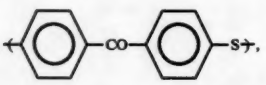
1. A process for the production of a melt-stable poly(arylene thioether-ketone), which comprises polymerizing an alkali metal sulfide and a dihalogenated aromatic compound consisting principally of 4,4'-dichlorobenzophenone and/or 4,4'-dibromobenzophenone by dehalogenation and sulfuration reaction in an organic amide solvent, under the following conditions (a)–(c):

(a) ratio of the water content to the amount of the charged organic amide solvent being 2.5–15 (mole/kg);

(b) ratio of the amount of the charged dihalogenated aromatic compound to the amount of the charged alkali metal sulfide being 0.95–1.2 (mole/mole); and

(c) reaction temperature being 60°–300° C. with a proviso that the reaction time at 210° C. and higher is within 10 hours,

said poly(arylene thioether-ketone) having predominant recurring units of the formula



wherein the —CO— and —S— are in the para position to each other, and having a residual melt crystallization enthalpy, ΔHmc (420° C./10 min) being at least 10 J/g and a melt crystallization temperature, Tmc (420° C./10 min) being at least 210° C., wherein said ΔHmc (420° C./10 min) and Tmc (420° C./10 min) are determined by a differential scanning colorimeter at a cooling rate of 10° C./min after the poly(arylene thioether-ketone) is held at 50° C. for 5 minutes in an inert gas atmosphere, heated to 420° C. at a rate of 75° C./min and then held for 10 minutes at 420° C.

4,886,872

NOVEL CATIONIC HYDROXAMATE POLYMERS

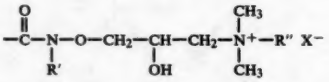
Dodd W. Fong, Naperville, and Josepha M. Fu, Chicago, both of Ill., assignors to Nalco Chemical Company, Naperville, Ill.

Filed May 22, 1989, Ser. No. 355,269

Int. Cl.[4] C08F *20/58, 220/32*

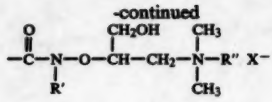
U.S. Cl. 525—329.4 **10 Claims**

1. A polymer having a weight average molecular weight ranging from between about 1,000 to about 10,000,000 which polymer contains at least 5 mole percent of pendant functional groups represented by:



(a)

-continued



(b)

or mixtures thereof;

wherein R' is chosen from the group consisting of H, and lower linear or branched alkyl groups containing from one to six carbon atoms; R'' is H, C_1–C_{12} linear, branched, or cyclic alkyl group, or a C_6–C_{12} aromatic, aralkyl, or alkaryl hydrocarbon group, and X is at least one of an anionic gegenion, present in an electroneutralizing amount.

4,886,873

AROMATIC HETERO RING-CONTAINING POLYIMIDE AND ITS COMPOSITE

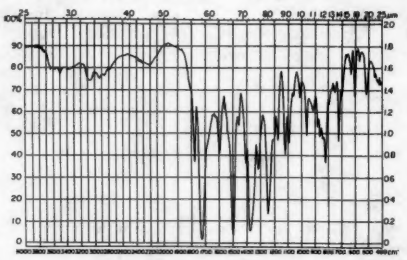
Seiichi Mukai, Kunitachi; Masatoshi Kimura, and Shohachi Morita, both of Yokohama, all of Japan, assignors to Director-General of Agency of Industrial Science and Technology, Tokyo, Japan

Filed Mar. 7, 1988, Ser. No. 164,899

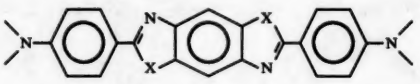
Claims priority, application Japan, Apr. 14, 1987, 62-89758; Apr. 14, 1987, 62-89761

Int. Cl.[4] C08G *69/26*

U.S. Cl. 528—353 **9 Claims**

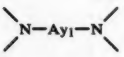


1. An aromatic hetero ring-containing heat-resistant polyimide having a high modulus of elasticity, comprising substantially equal amounts of (1) structural units of Group 1, and (2) structural units of Group 2, wherein the structural units of Group 1 comprise (i) from 30 to 100 mol% of a unit of the formula:



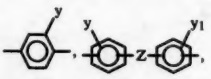
(I)

wherein X is S or O, and (ii) from 0 to 70 mol% of a unit of the formula:



(II)

wherein Ar_1 is:



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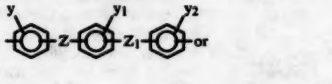
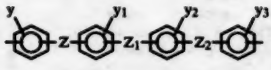
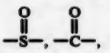


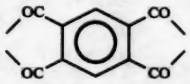


wherein each of y, y_1, y_2 and y_3 is a hydrogen atom, an alkyl group, an alkoxy group or a halogen atom, and each of Z, Z_1 and Z_2 is a single bond, —O—, —CH_2—,



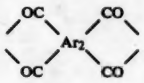
—SO_2—, —$C(CH_3)_2$— or —$C(CF_3)_2$, and the structural units of Group 2 comprise (i) from 70 to 100 mol% of a unit of the formula:

(III)

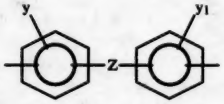


and (ii) from 0 to 30 mol% of a unit of the formula:

(IV)

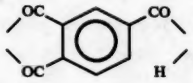


wherein Ar_2 is:



wherein Z, y and y_1 are as defined above, or a unit of the formula:

(V)



or a combination thereof.

4,886,874

POLYIMIDE HAVING EXCELLENT THERMAL DIMENSIONAL STABILITY

Hirosaku Nagano, Ootsu; Hideki Kawai, and Kiyokazu Akahori, both of Kobe, all of Japan, assignors to Kanegafuchi Chemical Ind. Co., Ltd., Osaka, Japan

Filed Jan. 20, 1988, Ser. No. 146,161

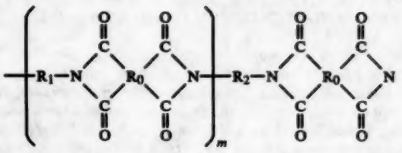
Claims priority, application Japan, Jan. 20, 1987, 62-8947; Jan. 20, 1987, 62-8949; Jul. 13, 1987, 62-174128

Int. Cl.[4] C08G *69/26*

U.S. Cl. 528—353 **13 Claims**

1. A polyimide copolymer containing repeating units of formula (I)

(I)



wherein each of R_1 and R_2 is independently

and R_1 and R_2 are different from each other; R_0 is an aromatic group having a valency of 4; and m is a positive integer.

4,886,875

END-CAPPING OF POLYARYLATE CARBOXYL ACID ENDS BY USE OF AROMATIC CARBONATES

Frank P. Gay; Francis M. Logullo, both of Hockessin, Del.; Robert R. Luise, Boothwyn, Pa., and Mark P. Mack, Newark, Del., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Dec. 7, 1988, Ser. No. 281,036

Int. Cl.[4] C08G *63/12*

U.S. Cl. 525—439 **23 Claims**

1. A process for reducing the terminal carboxyl acid group concentration of a polyarylate resin which comprises melting a mixture of the polyarylate resin with from an end-capping amount to a slight excess thereof of an aromatic carbonate capping agent selected from the group consisting of diphenyl carbonates, unsubstituted polyarylcarbonate oligomers, unsubstituted polyarylcarbonate polymers, substituted polyarylcarbonate oligomers, and substituted polyarylcarbonate polymers, and reacting the mixture under heat to produce an end-capped polyarylate resin having a terminal carboxyl acid group concentration that is less than that of the polyarylate resin.

4,886,876

FACTOR VIII COAGULANT POLYPEPTIDES

Theodore S. Zimmerman, and Carol A. Fulcher, both of LaJolla, Calif., assignors to Scripps Clinic and Research Foundation, LaJolla, Calif.

Continuation of Ser. No. 673,916, Nov. 21, 1984, Pat. No. 4,657,894, and a continuation-in-part of Ser. No. 481,105, Mar. 31, 1983, abandoned, and a continuation-in-part of Ser. No. 556,508, Nov. 30, 1983, abandoned. This application Apr. 13, 1987, Ser. No. 37,615

The portion of the term of this patent subsequent to Apr. 14, 2004, has been disclaimed.

Int. Cl.[4] A61K *37/02*; C07K *15/06*

U.S. Cl. 530—383 **44 Claims**

1. An active factor VIII:C coagulant polypeptide having a molecular weight in the range of about 79,000–80,000 and having a partial protein amino acid sequence as follows:

SER—PHE—GLN—LYS—LYS—THR—ARG—
HIS—TYR—PHE—ILE—ALA—ALA—VAL—
GLU—ARG—LEU—TRP—ASP—TYR—GLY—
MET—SER—SER—SER—PRO.

4,886,877

NOVEL 2'-DEOXY-5-SUBSTITUTED URIDINE DERIVATIVES, PROCESSES FOR PREPARING THE SAME AND ANTITUMOR AGENT CONTAINING THE SAME

Setsuro Fujii, Toyonaka; Jun-ichi Yamashita, Tokushima; Hiroshi Matsumoto, Tokushima; Setsuo Takeda, Tokushima; Tadafumi Terada, Tokushima; Mitsugi Yasumoto, Tokushima, and Norio Unemi, Tokushima, all of Japan, assignors to Taiho Pharmaceutical Company Limited, Tokyo, Japan

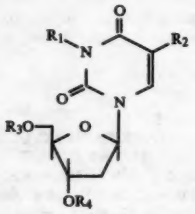
Continuation of Ser. No. 611,678, May 18, 1984, abandoned. This application Feb. 26, 1988, Ser. No. 163,237

Claims priority, application Japan, May 23, 1983, 58-91190; Sep. 14, 1983, 58-170149; Sep. 14, 1983, 58-170147

Int. Cl.[4] C07H *19/06*

U.S. Cl. 536—23 18 Claims

1. A 2'-deoxy-5-substituted uridine derivative represented by the formula (I),



(I)

wherein R_1 is a hydrogen atom, a benzoyl group or a tetrahydrofuranyl group; R_2 is a trifluoromethyl group; and one of R_3 and R_4 is a hydrogen atom and the other one is a lower alkyl group having 1 to 6 carbon atoms, an alkenyl group having 2 to 6 carbon atoms, a benzyl group or a benzyl group having substituents selected from the group consisting of a halogen atom, an alkyl group having 1 to 4 carbon atoms, an alkoxy group having 1 to 4 carbon atoms and a nitro group.

4,886,878

MODIFIED ZEIN GENES CONTAINING LYSINE

Brian Larkins, Tucson, Ariz.; Richard E. Cuellar, Glen Ellyn, Ill.; John C. Wallace, West Lafayette, Ind., and Gad Galili, Rehovot, Israel, assignors to Lubrizol Genetics, Inc., Wickliffe, Ohio and Purdue Research Foundation, Inc., West Lafayette, Ind.

Continuation of Ser. No. 929,751, Nov. 12, 1986, abandoned, which is a continuation-in-part of Ser. No. 744,913, Jun. 12, 1985, abandoned. This application Nov. 22, 1988, Ser. No. 274,828

Int. Cl.[4] C07H *23/00, 19/06, 15/12*

U.S. Cl. 536—26 10 Claims

1. A DNA segment encoding a modified 19 kd or 22 kd pre-zein wherein the pre-zein coding sequence comprises a codon for lysine, wherein said codon for lysine is located within the DNA sequence which encodes an internal repeated region of said pre-zein.

4,886,879

PROCESS FOR THE PREPARATION OF TRIFLUORODICHLOROETHYL-SUBSTITUTED ACIDS AND ZINC COMPOUNDS

Robert W. Lang, Pratteln, Switzerland, and Bernd Klingert, Inzlingen, Fed. Rep. of Germany, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Division of Ser. No. 835,481, Mar. 3, 1986, Pat. No. 4,759,881. This application Apr. 1, 1988, Ser. No. 176,580

Claims priority, application Switzerland, Mar. 11, 1985, 1090/85

Int. Cl.[4] C07F *3/06*

U.S. Cl. 540—486 4 Claims

1. A zinc compound of formula II

$CF_3CCl_2ZnCl.yl$ (II)

wherein y is 1 or 2 and L is a solvent ligand selected from the group consisting of dimethylformamide, diethylformamide, dimethylacetamide, tetramethylurea, N-formylpyrrolidine, N-methylpropiolactam, N-methylpyrrolidone, N-ethylpyrrolidone, N-methylpiperidone, N-methyl-ε-caprolactam, dimethyl sulfoxide, methylethyl sulfoxide, diethyl sulfoxide, tetramethylene sulfoxide and pentamethylene sulfoxide.

4,886,880

PROCESS FOR THE PREPARATION OF TRIPHENDIOXAZINES

Holger Hahn, Grenzach-Wyhlen, and Rudolf Blattner, Rheinfelden, both of Fed. Rep. of Germany, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Jun. 28, 1988, Ser. No. 212,534

Claims priority, application Canada, Jul. 7, 1987, 2579/87

Int. Cl.[4] C07D *498/04*

U.S. Cl. 544—76 13 Claims

1. A process for the preparation of a triphendioxazine by oxidising cyclisation of a 2,5-diarylamino-1,4-benzoquinone with oleum and further optional oxidising agents and/or catalysts, which process comprises charging a reactor simultaneously with the 2,5 diarylamino-1,4-benzoquinone and oleum.

4,886,881

PREPARATION OF 2-AMINO TRIAZINES

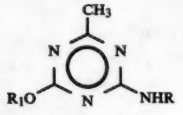
George C. Chiang, Wilmington, Del., and Masuo Toji, Sewell, N.J., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed May 12, 1989, Ser. No. 351,102

Int. Cl.[4] C07D *251/16, 251/42*

U.S. Cl. 544—194 15 Claims

1. A process for the preparation of aminotriazines of the formula

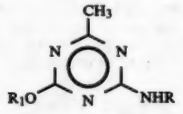


wherein

R is H or CH_3; and

R_1 is C_1–C_3 alkyl;

said process comprising reacting dicyandiamide of the formula



where R is as defined above with an amount of 0.5 to 5.0 mol of trimethylorthoacetate per mole of dicyandiamide in the presence of 10 to 50 mol percent of a suitable Lewis acid catalyst and a solvent at 50° to 100° C. and a pressure of 1 to 5 atmospheres for a time of 6 to 48 hours.

4,886,882

HYDROXYOXAALKYLMELAMINES

Klaus Ebel, Ludwigshafen, and Wolfgang Reuther, Heidelberg, both of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

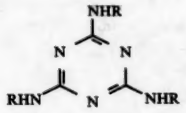
Filed Aug. 18, 1986, Ser. No. 897,261

Claims priority, application Fed. Rep. of Germany, Sep. 7, 1985, 3531912

Int. Cl.[4] C07D *251/70*

U.S. Cl. 544—196 **2 Claims**

1. A hydroxyoxaalkylmelamine of the formula I



(I)

where the radicals R may be hydrogen or the 5-hydroxy-3-oxapentyl radical of the formula III

$$HO—CH_2—CH_2—O—CH_2—CH_2— \quad (III),$$

with the proviso that at least one of the R radicals is a radical of the formula III.

4,886,883

SUBSTITUTED 1,2,4-TRIAZOLO[1,5-A]PYRIMIDINE-2-SULFONYL CHLORIDES

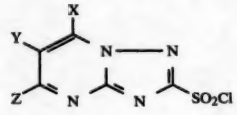
William A. Kleschick, Martinez, Calif.; Robert J. Ehr, Eden Prairie, Minn.; Mark J. Costales, Concord, Calif.; Ben C. Gerwick, III, Clayton, Calif.; Richard W. Meikle, deceased, late of Walnut Creek, Calif. (by Diane Meikle, heir); William T. Monte, Concord, Calif., and Norman R. Pearson, Walnut Creek, Calif., assignors to The Dow Chemical Company, Midland, Mich.

Division of Ser. No. 940,480, Dec. 10, 1986, Pat. No. 4,818,273, which is a continuation-in-part of Ser. No. 768,353, Aug. 22, 1985, abandoned, which is a continuation-in-part of Ser. No. 551,758, Nov. 14, 1983, abandoned. This application Oct. 21, 1988, Ser. No. 261,460

Int. Cl.[4] C07D *487/04*

U.S. Cl. 544—263 **7 Claims**

1. A compound having the formula



wherein

X represents H, OCH_3, OC_2H_5, or CF_3, Y represents H, and Z represents CH_3 or OCH_3; wherein X represents Cl, Y represents H, and Z represents CH_3 or Cl; or wherein X and Z each represent H and Y represents Cl.

4,886,884

DERIVATIVES FROM CERVINOMYCIN BASED ANTIBIOTICS

Satoshi Omura; Akira Nakagawa, both of Tokyo, and Yuzuru Iwai, Chiba, all of Japan, assignors to The Kitazato Institute, Tokyo, Japan

PCT No. PCT/JP87/00103, § 371 Date Oct. 19, 1987, § 102(e) Date Oct. 19, 1987, PCT Pub. No. WO87/05023, PCT Pub. Date Aug. 27, 1987

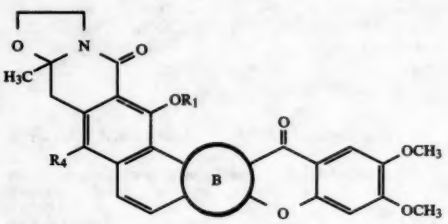
PCT Filed Feb. 17, 1987, Ser. No. 124,786

Claims priority, application Japan, Feb. 17, 1986, 61-32387

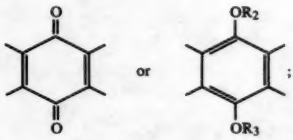
Int. Cl.[4] C07D *498/12*

U.S. Cl. 546—36 **1 Claim**

1. A compound represented by formula:



wherein ring B represents



wherein at least one of R_1, R_2 and R_3 represents an acetyl group, and the rest of R_1, R_2, R_3 and R_4 represents a hydrogen atom; or at least one of R_1, R_2, R_3 and R_4 represents a methyl group and the rest of R_1, R_2, R_3 and R_4 represents a hydrogen atom.

4,886,885

COMPOUND CONTAINING TETRAZOLYL GROUPS AND THEIR USE FOR TREATING ALLERGIES AND CARDIOVASCULAR DISEASE

Stephen R. Baker, Camberley, and Alec Todd, Wokingham, both of England, assignors to Lilly Industries Limited, Basingstoke, England

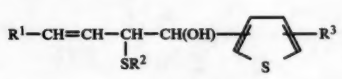
Filed Oct. 26, 1988, Ser. No. 262,754

Claims priority, application United Kingdom, Oct. 28, 1987, 8725260

Int. Cl.[4] C07D *409/06*; A61K *31/41*

U.S. Cl. 514—381 **8 Claims**

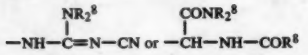
1. A compound of the formula



(I)

in which R^1 is C_{7-20} alkyl, C_{7-20} alkenyl or C_{7-20} alkynyl, the alkyl, alkenyl or alkynyl group being optionally substituted by phenyl or substituted phenyl and the alkenyl and alkynyl groups containing 1 to 3 unsaturated bonds, R^2 is (i) optionally substituted phenyl, (ii) C_{1-10} alkyl optionally substituted by one or more substituents selected from optionally protected hydroxyl, optionally protected carboxyl, nitrile, optionally protected tetrazolyl, $—COR^4$ where R^4 is C_{1-4} alkyl, C_{1-4}

alkoxy, an optionally protected amino acid residue or $—NR_2^5$ where each R^5 is hydrogen or C_{1-4} alkyl, and $—NHR^6$ where R^6 is hydrogen, a protecting group, an optionally protected amino acid residue, C_{1-4} alkyl or $—COR^7$ where R^7 is C_{1-4} alkyl or C_{1-4} alkoxy, or (iii) C_{1-10} alkyl substituted with a group selected from



where each R^8 is hydrogen or C_{1-4} alkyl, and R^3 is hydrogen, carboxyl, C_{2-5} alkoxycarbonyl, C_{1-4} alkyl, C_{1-4} alkoxy, hydroxyl, optionally protected tetrazolyl, halo, trifluoromethyl, nitrile, nitro and $—CONR_2^9$ where each R^9 is hydrogen or C_{1-4} alkyl; and pharmaceutically acceptable salts thereof provided that R^3 is tetrazolyl and/or R^2 is C_1–C_{10} alkyl substituted with tetrazolyl.

4,886,886

SUBSTITUTED 1,3,4,9-TETRAHYDROPYRANO[3,4-B]INDOLE-1-ACETIC ACIDS

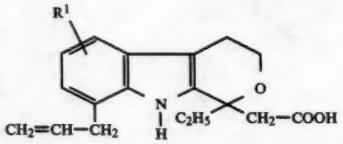
Brian A. McKittrick, Bloomfield, and Alan H. Katz, Lawrenceville, both of N.J., assignors to American Home Products Corporation, New York, N.Y.

Division of Ser. No. 117,775, Nov. 5, 1987, Pat. No. 4,785,015. This application Jul. 25, 1988, Ser. No. 223,481

Int. Cl.[4] C07D *405/02*

U.S. Cl. 548—432 **3 Claims**

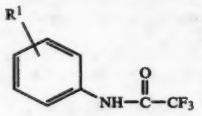
1. The process for producing the compounds having the structure



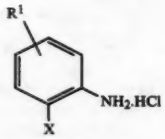
(II)

wherein R^1 is hydrogen, lower alkyl containing 1 to 4 carbon atoms or halogen, and the pharmaceutically acceptable salts thereof which comprises

(a) successively halogenating in the presence of t-butyllithium and tetramethylenediamine and hydrolyzing with a strong base the compound of structure

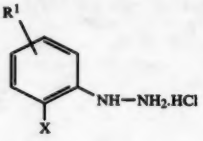


wherein R^1 is as defined above to produce the amine of structure



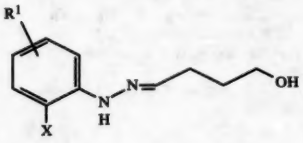
wherein R^1 is as defined and X is bromine or iodine

(b) reacting said amine successively with HNO_2 in aqueous HCl and $SnCl_2$ in aqueous HCl to produce the hydrazine of structure

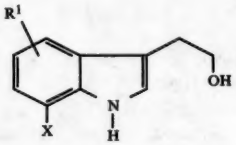


wherein R^1 and X are as defined above

(c) reacting said hydrazine with dihydrofuran to produce the corresponding hydrazone

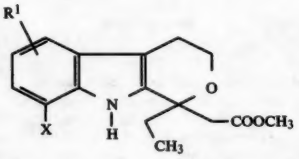


wherein R^1 and X are as defined above and in the presence of zinc chloride converting the hydrazone to the corresponding tryptophol of structure



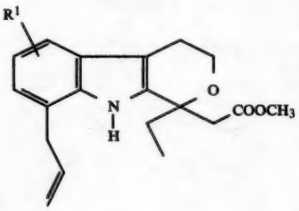
wherein R^1 and X are as defined above

(d) cyclizing said tryptophol with methyl 3-methoxy-2-pentenoate in the presence of boron trifluoride etherate to produce the indole of structure



wherein R^1 and X are as defined above

(e) reacting said indole with tributylallyltin in the presence of tetrakis(triphenylphosphine)palladium in a sealed container under an inert atmosphere to produce the ester of structure



wherein R^1 is as defined above

(f) hydrolyzing said ester with a strong base to produce the desired compound of structure (I) and optionally converting said compound to a pharmaceutically acceptable salt.

4,886,887

PROCESS FOR THE PREPARATION OF INDOLINES

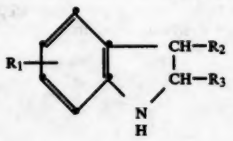
Beat M. Aebli, Basle, and Claude Gremmelmaier, Aesch, both of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Continuation-in-part of Ser. No. 796,358, Nov. 8, 1985, abandoned, and a continuation-in-part of Ser. No. 884,836, Jul. 11, 1986, abandoned. This application Oct. 9, 1986, Ser. No. 917,346

Int. Cl.[4] C07D *209/08*

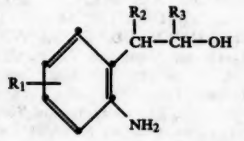
U.S. Cl. 548—490 23 Claims

1. A process for the preparation of indolines of the formula



(I)

wherein R_1 is hydrogen of C_1–C_4alkyl and each of R_2 and R_3independently of the other is hydrogen, C_1–C_4alkyl or phenyl, by cyclodehydrating a 2-(2'-aminophenyl)ethanol of the formula



(II)

wherein R_1, R_2 and R_3 are as defined for formula I, in the presence of a catalyst, which process comprises carrying out the cyclodehydration of said 2-(2'-aminophenyl)ethanol of formula II in the presence of an amorphous aluminum silicate which is substantially free of other metal ions, wherein the temperature is 200°–300° C. and the throughput of the 2-(2'-aminophenyl)ethanol of formula II is 0.1 to 10 kg per kg of said amorphous aluminum silicate and per hour when said process is carried out in the gaseous phase or wherein the temperature is 150°–350° C. and the amorphous aluminium silicate is used in an amount of 0.5 to 10% by weight, based on 2-(2'-aminophenyl)ethanol of formula II when carried out discontinuously and 0.5 to 10% by weight, based on the amount of reaction mixture present in the reactor when carried out continuously in the liquid phase.

4,886,888

EXTRACTION OF AMINO AN ACID FROM AQUEOUS MIXTURES THEREOF

Francis W. Tuominen, Minneapolis; Ronald R. Swanson, Taylors Falls; Phillip L. Mattison, New Brighton; Kenneth D. MacKay, Plymouth, and Bradley W. Glorvigen, St. Paul, all of Minn., assignors to Henkel Corporation, Ambler, Pa.

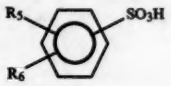
Division of Ser. No. 617,767, Jun. 6, 1984, Pat. No. 4,661,606. This application Dec. 22, 1986, Ser. No. 945,735

Int. Cl.[4] C07D *209/20, 99/12, 101/02*

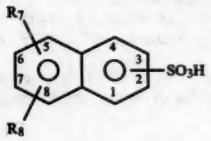
U.S. Cl. 548—497 8 Claims

1. A process for the extraction of an amino acid from an aqueous solution thereof in which said amino acid is not present in its zwitterionic form, said amino acid being selected from the group consisting of isoleucine, leucine, lysine, methionine, beta-alanine, phenylalanine, threonine, tryptophan, valine, tyrosine, glutamic acid and aspartic acid, comprising

(a) contacting said aqueous solution containing said aqueous solution with a solution of a water insoluble extractant in a water immiscible organic solvent which forms a separate organic phase from said aqueous solution, said contact taking place for a sufficient length of time to allow the amino acid to be extracted from said aqueous phase into said organic phase, said water insoluble extractant being an organic sulfonic acid selected from the group consisting or organic sulfonic acids having the formula:



where R_5 and R_6 are aliphatic hydrocarbon groups individually with from about 6 to about 22 carbon atoms, where R_5 and R_6 together contain at least 18 carbon atoms, and where neither R_5 and R_6 are smaller than a C_6; and organic sulfonic acids having the structural formula:



where R_7 and R_8 are aliphatic hydrocarbon groups containing from about 4 to about 22 carbon atoms, where R_7, R_8, or the sulfonic group may be attached to positions 1–8 on the aromatic rings, and where neither R_7nor R_8 is smaller than a C_4, and where R_7 and R_8 together have at least 18 carbon atoms,

(b) separating said organic phase containing said amino acid from said aqueous phase,

(c) removing said amino acid from said organic phase now containing said amino acid by contacting said organic phase with an aqueous acidic solution or a gas selected from the group consisting of NH_3, HCl, HBr, Co_2 and SO_2.

4,886,889

PROCESS FOR RECOVERY OF AN AMINO ACID FROM AQUEOUS MIXTURES THEREOF

Phillip L. Mattison, New Brighton; Ronald P. Wirth, Minneapolis; Michael J. Virnig, Fridley, and LeRoy Krbechek, Golden Valley, all of Minn., assignors to Henkel Corporation, Ambler, Pa.

Filed May 16, 1986, Ser. No. 864,064

Int. Cl.[4] C07D *209/20, 99/12, 101/02*

U.S. Cl. 548—497 33 Claims

1. In a process of recovering an amino acid from an aqueous solution containing said amino acid which comprises extracting said amino acid with a water immiscible organic solution of a water insoluble extractant whereby an aqueous phase and an organic phase forms which phases are immiscible and which disengage and are separated, and recovering said amino acid from said water immiscible organic solution, the improvement comprising treating said aqueous amino acid containing solution prior to said extraction with a process selected from the group consisting of

(a) ultrafiltration

(b) adsorption and

(c) a combination of (a) and (b);

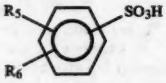
wherein said amino acid is a naturally occurring amino acid, and said ultrafiltration comprises having said aqueous solution contact a semipermeable membrane containing micropores with a mean micropore diameter less than 0.2 micron, sufficient to permit passage of said amino acid and prevent passage of undesired materials in said aqueous solution affecting phase disengagement in said extraction, to provide a diffusate or permeate containing said amino acid; and extracting said amino

acid from said aqueous solution with a water immiscible organic solution of a water insoluble extractant to form an aqueous phase and an organic phase immiscible therewith, which phases disengage in a lesser time than such phases would disengage if said treatment prior to said extraction were not conducted, wherein said extractant is selected from the group consisting of:

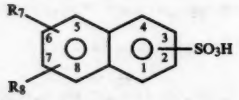
(x) a cationic extractant having a quaternary ammonium ion of the formula:

where R_1, R_2, R_3 and R_4 individually are aliphatic hydrocarbon groups containing from about 1 to about 22 carbon atoms and where R_1, R_2, R_3 and R_4 together have a minimum of 25 carbon atoms, and where at least three groups selected from the group consisting of R_1, R_2, R_3 and R_4 are at least a C_4; and

(y) an anionic sulfonic acid selected from the group consisting of organic sulfonic acids having the structural formula:



where R_5 and R_6 are aliphatic hydrocarbon groups individually having from about 6 to about 22 carbon atoms, where R_5 and R_6 together contain at least 18 carbon atoms, and organic sulfonic acids having the structural formula:



where R_7 and R_8 are aliphatic groups containing from about 4 to about 22 carbon atoms; where R_7 and R_8, or the sulfonic group may be attached to positions 1–8 on the aromatic rings, and where R_7 and R_8 together have at least 18 carbon atoms;

and said amino acid is recovered from said water immiscible organic solution of said water insoluble extractant by contacting said water immiscible solution with an acid.

8. In a process as defined in claim 1 wherein said amino acid is selected from the group consisting of arginine, histidine, isoleucine, leucine, lysine, methionine, phenylalanine, threonine, tryptophan, β-alanine, tyrosine, glutamic acid and aspartic acid.

4,886,890

DIQUARTERNARY NITROGEN COMPOUNDS

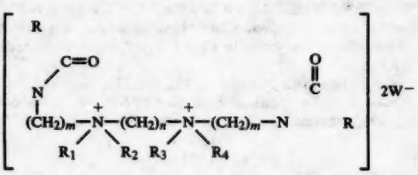
Ratan K. Chaudhuri, Butler; David J. Tracy, Lincoln Park, and Robert B. Login, Oakland, all of N.J., assignors to GAF Corporation, Wayne, N.J.

Filed Sep. 29, 1988, Ser. No. 250,587

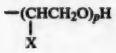
Int. Cl.[4] C07D 207/00

U.S. Cl. 548—519 **6 Claims**

1. The diquaternized compound having the formula



wherein W^- is an anion; m and n are integers having a value from 1 to 4; R is alkylene having from 3 to 8 carbon atoms; R_1 is a radical having from 8 to 25 carbon atoms and is selected from the group of alkyl, alkenyl and alkoxy alkylene and each of R_2, R_3 and R_4 is a radical having from 1 to 25 carbon atoms and is alkyl, alkoxy or



where p has a value of from 1 to 4 and X is hydrogen or methyl.

4,886,891

PROCESS FOR PREPARING 1,1-DISUBSTITUTED ETHYLENE DERIVATIVE BY REACTION OF LEAD WITH A CARBINOL DERIVATIVE

Shigeru Torii, Okayama; Masatoshi Taniguchi, Tokushima; Michio Sasaoka, Tokushima; Yoshihisa Tomotaki, Tokushima; Mitsuo Akada, Tokushima; Hideo Tanaka, Okayama; Akira Suzuki, and Shiro Yamashita, both of Kurashiki, all of Japan, assignors to Otsuka Kagaku Kabushiki Kaisha, Osaka, Japan

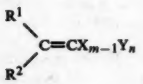
Filed Dec. 18, 1987, Ser. No. 134,852

Claims priority, application Japan, Dec. 20, 1986, 61-304810; Mar. 6, 1987, 62-52625

Int. Cl.[4] C07C 37/00

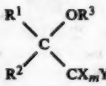
U.S. Cl. 549—434 **8 Claims**

1. A process for preparing a 1,1-disubstituted ethylene derivative of the formula



(II)

which comprises reacting lead with a carbinol derivative of the formula



(I)

wherein R^1 and R^2 are same or different, substituted or unsubstituted and are each hydrogen, C_1–C_{10} straight-chain or branched-chain alkyl, C_1–C_{10} straight-chain or branched-chain alkyl having 1 to 3 CH_2 groups replaced with —CO—, C_3–C_{10} alicyclic, C_3–C_{10} alicyclic having at least one side chain having 1 to 5 carbons, C_2–C_{10} straight-chain or branched-chain unsaturated hydrocarbon, aryl, heterocyclic, aralkyl or aryloxy and R^1 and R^2 taken together may form a ring, R^3 is hydrogen atom, C_1–C_5 straight-chain or branched-chain alkyl, substituted or unsubstituted aryl, aralkyl having a substituted or unsubstituted aryl, acyl or $—(CH_2)_j—$ bonded to R^1 in one terminal, j=0~5, a part of $—(CH_2)_j—$ group is —CO—, X and Y are same or different and are fluorine, chlorine, bromine or iodine atom, m and n are an integer of 1 to 2, m+n=3, and

when m is 2, Y is fluorine, chlorine, bromine, iodine, further hydrogen, carboxy, protected carboxyl, amido, cyano or trifluoromethyl, said reaction being conducted in an organic solvent or aqueous organic solvent for said carbinol derivative, and using about 1.0 to 10 moles atom of lead per mole atom of the carbinol derivative.

4,886,892

PROCESS FOR THE PREPARATION OF OXIRANES

Rudolf Zerbes, Wuppertal, Fed. Rep. of Germany; Siegfried W. Linke, Seould, Rep. of Korea, and Karl H. Mohrmann, Wuppertal, Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

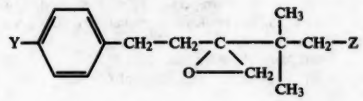
Continuation of Ser. No. 760,025, Jul. 29, 1985, abandoned, which is a division of Ser. No. 603,478, Apr. 24, 1984, abandoned. This application Jan. 27, 1987, Ser. No. 7,078

Claims priority, application Fed. Rep. of Germany, Apr. 29, 1983, 3315619

Int. Cl.[4] C07D *301/02*

U.S. Cl. 549—519 5 Claims

1. A process for the preparation of an oxirane of the formula

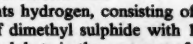


(I)

in which

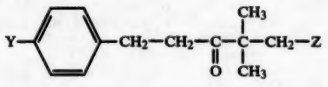
Y represents chlorine and

Z represents hydrogen, consisting of contacting 1.0 to 1.6 moles of dimethyl sulphide with 1.0 to 1.5 moles of dimethyl sulphate in the presence of acetonitrile or toluene and contacting the resultant trimethylsulphonium methyl sulphate of the formula



(II)

with a ketone of the formula



(III)

in which

Y and Z have the meanings indicated above, in the presence of 1.5 to 2.0 moles of potassium hydroxide or sodium hydroxide powder per mole of said ketone and in the presence of acetonitrile or toluene at a temperature between 10° C. and 40° C.

4,886,893

PROCESS FOR THE PREPARATION OF MODIFIED TRIGLYCERIDES

Alfred Meffert, Monheim, and Hermann Kluth, Duesseldorf, both of Fed. Rep. of Germany, assignors to Henkel Kommanditgesellschaft auf Aktien, Duesseldorf, Fed. Rep. of Germany

Continuation of Ser. No. 561,627, Dec. 15, 1983, abandoned. This application Apr. 9, 1987, Ser. No. 37,126

Claims priority, application Fed. Rep. of Germany, Dec. 16, 1982, 3246612

Int. Cl.[4] C07D *303/12*

U.S. Cl. 549—562 13 Claims

1. A process for the partial ring opening of epoxidized triglycerides of a fatty acid mixture wherein the fatty acid mixture contains at least partly olefinically unsaturated fatty acids comprising the step of

(A) reacting said epoxidized triglycerides with a large excess, based on epoxide groups, of at least one alcohol in the presence of a small quantity of an acidic or a strongly basic catalyst at a temperature in the range of from about 50° to about 110° C.; and

(B) terminating the reaction after from about 30 to about 70 mole percent of the epoxide groups in the epoxidized triglycerides are opened;

wherein the alcohol reactant in step (A) is one or more of the following:

(i) a primary or secondary, saturated or unsaturated monofunctional alcohol containing from 1 to 8 carbon atoms,

(ii) a bifunctional alcohol containing from 2 to 6 carbon atoms,

(iii) a monoether of a bifunctional alcohol containing a total of from 3 to 8 carbon atoms, and

(iv) a trifunctional alcohol containing from 3 to 6 carbon atoms; and

wherein the epoxidized triglyceride in step A contains from about 5.6 to about 10% by weight of epoxide oxygen.

4,886,894

NOVEL ORGANIC PLATINUM COMPLEX AND PROCESS FOR THE PREPARATION THEREOF

Kenji Tsujihara, Urawa; Yoshihisa Arai, Funabashi; Osamu Ohtsuki, Nagaokakyo, and Tadashi Nakatani, Takatsuki, all of Japan, assignors to Tanabe Seivaku Co., Ltd., Osaka, Japan

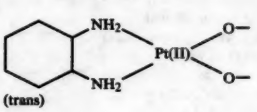
Filed Mar. 4, 1988, Ser. No. 164,489

Claims priority, application Japan, Mar. 6, 1987, 62-52823

Int. Cl.[4] C07F *7/28;* A61K *31/28*

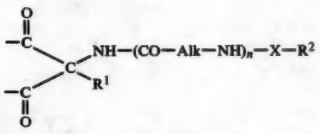
U.S. Cl. 556—40 5 Claims

1. An organic platinum complex of the formula:



(I)

(trans)



wherein

R^1 is a hydrogen atom; R_2 is a hydrogen atom, an alkyl group having 1 to 3 carbon atoms, an alkyl group having 1 to 3 carbon atoms which has a halogen atom, an amino group, or a (tetrahydrofurylcarbonyl) pyrrolidinyl group;

Alk is an alkylene group having 1 to 3 carbon atoms;

X is carbonyl or sulfonyl group; and

n is 1.

4,886,895

PHOSPHATE-CONTAINING AND PHOSPHONATE-CONTAINING PHOSPHATE ESTERS

Thomas A. Hardy, Thousand Oaks, Calif., and Edward N. Walsh, New York, N.Y., assignors to Akzo America Inc., New York, N.Y.

Division of Ser. No. 66,664, Jun. 26, 1987, Pat. No. 4,820,854, which is a division of Ser. No. 737,374, May 23, 1985, Pat. No. 4,697,030. This application Feb. 6, 1989, Ser. No. 306,113

Int. Cl.[4] C07F *9/14, 9/42*

U.S. Cl. 558—161 11 Claims

1. A compound of the formula:

wherein R is:

and/or R is

R_3 and R_5 are the same or different and are alkyl, haloalkyl, aryl or haloaryl;
R_6 and R_7 are the same or different and are hydrogen, alkyl, haloalkyl, aryl or haloaryl;
R_4 is alkylene or haloalkylene;
X is a halogen;
n is an integer from 1–2 and
z is an integer from 1–10.

4,886,896

1-[(DIORGANOOXYPHOSPHONYL)METHYL]-2,4- AND -2.6-DINITRO-BENZENES

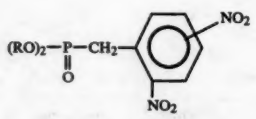
John A. Mikroyannidis, Patras, Greece, and Demetrius A. Kourtides, Gilroy, Calif., assignors to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.

Division of Ser. No. 641,152, Aug. 16, 1984, Pat. No. 4,689,421, which is a continuation-in-part of Ser. No. 522,629, Aug. 12, 1983, abandoned, which is a continuation-in-part of Ser. No. 493,864, May 12, 1983, abandoned. This application May 28, 1987, Ser. No. 54,982

Int. Cl.[4] C07S *9/40*

U.S. Cl. 558—193 **5 Claims**

1. (Diorganooxy phosphonyl) methyl dinitro benzene of the formula:



wherein R is an organo groups selected from non-nitratable alkyls having from 1 to 10 carbon atoms, or halogenated alkyls having from 1 to 10 carbon atoms and the two nitro groups are in the 2,4 and 2,6 positions.

4,886,897

S(4-HYDROXY-1-ISOPROPYL-4-METHYLHEXYL) THIOACETATE

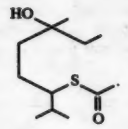
Richard M. Boden, Ocean, and Joseph A. McGhie, South Orange, both of N.J., assignors to International Flavors & Fragrances Inc., New York, N.Y.

Filed Nov. 18, 1988, Ser. No. 273,017

Int. Cl.[4] C07C *153/017*

U.S. Cl. 558—252 **1 Claim**

1. S(4-hydroxy-1-isopropyl-4-methylhexyl) thioacetate having the structure:



4,886,898

INTERMEDIATES FOR CIRCULATION-ACTIVE SUBSTITUTED AMINOMETHYL-5,6,7,8-TETRAHYDRONAPHTHYLOXY-ACETIC ACIDS

Ulrich Niewöhner, Wermelskirchen; Franz-Peter Hoever, Cologne; Folker Lieb, Leverkusen; Ulrich Rosentreter; Elisabeth Perzborn, both of Wuppertal; Volker-Bernd Fiedler, Leverkusen, and Friedel Seuter, Wuppertal, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

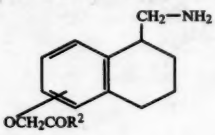
Filed May 16, 1989, Ser. No. 352,522

Claims priority, application Fed. Rep. of Germany, Dec. 10, 1986, 3642105

Int. Cl.[4] C07C *101/28, 103/28, 103/76*

U.S. Cl. 560—42 **1 Claim**

1. A compound of the formula



in which
R^2 is hydroxyl, alkoxy, phenoxy, benzoxy or NR^4R^5, and
R^4 and R^5 each independently is hydrogen, or alkyl, or one of the radicals R^4 or R^5 is benzyl.

4,886,899

HOUSEFLY CHEMOSTERILANTS

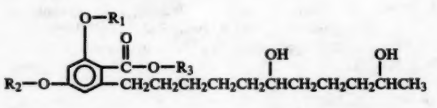
Martin J. Jacobs, Terre Haute, Ind., assignor to Pitman-Moore, Inc., Terre Haute, Ind.

Filed Jul. 5, 1988, Ser. No. 215,873

Int. Cl.[4] C07C *69/76*

U.S. Cl. 560—064 **20 Claims**

1. A compound having the formula:



wherein R_1 and R_2, which may be the same or different, are H, X, or COX, where X is an alkyl group having from 1–6 carbon atoms; and R_3 is an alkyl group having from 1–12 carbon atoms.

4,886,900

TETRAKIS(3-(3,5-DI-TERT.BUYL-4-HYDROXYPHENYL)-PROPIONYL-OXYMETHYL) METHANE WITH AMORPHOUS STRUCTURE, PROCESS FOR ITS PREPARATION AND ITS USE AS A STABILIZER

Carlo Neri, San Donato Milanese; Nereo Nodari, Spino D'Adda, and Giovanni Sandre, San Donato Milanese, all of Italy, assignors to Enichem Sintesi S.p.A., Palermo, Italy

Filed Jul. 17, 1987, Ser. No. 74,561
Claims priority, application Italy, Jul. 25, 1986, 21258 A/86
Int. Cl.[4] C07C *69/76*
U.S. Cl. 560—75 7 Claims

1. The compound:

Tetrakis(3-(3,5-di-tert.butyl-4-hydroxyphenyl)-propionyl-oxymethyl)methane having an amorphour structure, a glass transition temperature of from about 40° C. to 50° C. and no endothermic melting peaks at temperatures from 50° C. to 200° C., said amorphous tetrakis(3-(3,5-di-tert-.butyl-4-hydroxyphenyl)-propionyl-oxymethyl)methane maintaining unchanged said characteristics during at least four heating and cooling cycles between −100° C. and +100° C.

4,886,901

METHOD FOR PURIFYING A CRUDE DIMETHYL NAPHTHALENE DICARBOXYLATE

Juergen K. Holzhauer, Naperville; Robert D. Oltrogge, Lombard, and Dennis J. Michalak, Warrenville, all of Ill., assignors to Amoco Corporation, Chicago, Ill.

Filed Nov. 21, 1988, Ser. No. 274,238
Int. Cl.[4] C07C *67/48, 67/39*
U.S. Cl. 560—77 21 Claims

1. In a method for producing a dimethyl naphthalene dicarboxylate comprising oxidizing a dialkylnaphthalene wherein each alkyl group may be the same or different and is methyl, ethyl or propyl, or a partially oxidized derivative thereof, with an oxygen-containing gas in a solvent in the liquid phase at an elevated temperature and pressure and in the presence of an oxidation catalyst comprising a bromine component and at least one of a cobalt- or manganese-containing component to form a crude naphthalene dicarboxylic acid, and esterifying the resulting crude naphthalene dicarboxylic acid with methanol in the presence of an esterification catalyst at an elevated temperature and pressure to form a crude dimethyl naphthalene dicarboxylate: the improvement comprising purifying the resulting crude dimethyl naphthalene dicarboxylate by:

(a) washing the crude dicarboxylate with an alkylated or halogenated aromatic having a normal boiling point of less than 175° C., at a weight ratio in the range of from about 0.25 to about 5 parts of the alkylated or halogenated aromatic per part by weight of the dicarboxylate, to remove at least a substantial portion of the residual methanol and colored impurities, wherein optionally a base comprising a hydroxide, carbonate or bicarbonate of an alkali or alkaline earth metal is added at a weight ratio in the range of from about 0.001 to about 0.1 of the base per part by weight of the dicarboxylate;

(b) combining the washed dicarboxylate with an alkylated or halogenated aromatic having a normal boiling point of less than 175° C., at a weight ratio of from about 2 to about 10 parts of alkylated or halogenated aromatic per part ally the aforesaid base is added at a weight ratio in the range of from about 0.001 to about 0.1 part of the base per part by weight of the dicarboxylate;

(c) mixing the resulting combination at a temperature in the range of from about 65° C. to about 115° C. with water at a weight ratio in the range of from about 0.02 to about 0.3 part of water per part by weight of the dicarboxylate, wherein optionally the aforesaid base is added at a weight ratio in the range of from about 0.001 to about 0.1 part of the base per part by weight of the dicarboxylate, wherein the aforesaid base is added in at least one of steps (a), (b) and (c) at a total weight ratio in the range of from about 0.001 to about 0.1 part of the base per part by weight of the dicarboxylate;

(d) heating the resulting liquid mixture to a temperature in the range of from about 100° C. to about 140° C. to distill off the water and to dissolve substantially all of the dicarboxylate in the alkylated or halogenated aromatic combined in step (b);

(e) introducing to the resulting water-free solution in the alkylated or halogenated aromatic an alkali alkoxide containing up to 4 carbon atoms at a weight ratio of from about 0.001 to about 0.02 part of the alkoxide per part by weight of the dicarboxylate;

(f) removing solids from the resulting mixture at a temperature in the range of from about 120° C. to about 150° C.;

(g) crystallizing the dicarboxylate by cooling the resulting solid-free solution to a temperature in the range of from about 0° C. to about 50° C. with agitation; and

(h) separating the resulting purified dimethyl naphthalene dicarboxylate crystals from the liquid alkylated or halogenated aromatic.

4,886,902

PROCESS FOR THE PREPARATION OF ISOCYANATES AND THEIR USE FOR THE PREPARATION OF POLYISOCYANATES CONTAINING ESTER GROUPS

Werner Mormann, Kreustal, and Gabriele Leukel, Norken, both of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Division of Ser. No. 241,438, Sep. 7, 1988. This application Jun. 20, 1989, Ser. No. 368,750
Claims priority, application Fed. Rep. of Germany, Sep. 16, 1987, 3730986
Int. Cl.[4] C07C *69/76*
U.S. Cl. 560—106 1 Claim

1. A process for preparing a polyisocyanate containing ester groups comprising reacting an isocyanate-carboxylic acid halide with an isocyanate compound substituted with one or more silylated alcoholic or phenolic hydroxyl groups prepared by heating, in a temperature range of from about 20° C. to about 300° C., a mixture of

(i) an amine precursor corresponding to said isocyanate compound substituted with silylated hydroxyl groups, and

(ii) at least one to about 20 molar quantities of an organic polyisocyanate that is essentially non-volatile under the conditions used in preparing said isocyanate compound substituted with silylated hydroxyl groups.

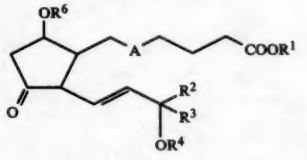
4,886,903

PROCESS FOR PRODUCTION OF PROSTAGLANDINS D2

Ryoji Noyori, Aichi; Masaaki Suzuki, Nogoya; Akira Yanagisawa, Nagoya, and Seizi Kurozumi, Kokubunji, all of Japan, assignors to Teijin Limited, Osaka, Japan

Continuation of Ser. No. 746,678, Jul. 1, 1985, abandoned. This application Sep. 13, 1988, Ser. No. 244,644
Claims priority, application Japan, Oct. 7, 1983, 58-187133
Int. Cl.[4] C07C *177/00*
U.S. Cl. 560—121 9 Claims

1. A process for the production of prostaglandin D_2 represented by the following formula (6)



(6)

wherein

A indicates a single bond, a double bond, or a triple bond,

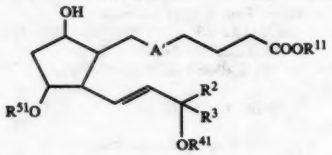
R^2 and R^3 are the same or different from each other, each representing a hydrogen atom, a $C_1 \sim C_{10}$ alkyl group which may be substituted or may not be substituted, or a cycloalkyl group which may be substituted or may not be substituted,

R^1 indicates a hydrogen atom, a $C_1 \sim C_{10}$ alkyl group, a phenyl group which may be substituted or may not be substituted, an alicyclic group which may be substituted or may not be substituted, a phenyl ($C_1 \sim C_2$) alkyl group which may be substituted or may not be substituted, a tri($C_1 \sim C_7$) hydrocarbon silyl group, or one equivalent of cation,

R^4 and R^6 are the same or different from each other, each representing a hydrogen atom or a group which forms an acetal bond together with an oxygen atom of a hydroxyl group,

and wherein the substituents for the alkyl group, phenyl group, phenyl alkyl group, or alicyclic group are selected from the group consisting of a halogen atom, a hydroxy group, a $C_2 \sim C_7$ acyloxy group, a $C_1 \sim C_7$ alkyl group which may be substituted with a halogen atom, a $C_1 \sim C_4$ alkoxy group which may be substituted with a halogen atom, a nitrile group, a carboxyl group, and a ($C_1 \sim C_6$) alkoxycarbonyl group,

comprising treating 7-hydroxy prostaglandin $F_2\alpha$ expressed by the following formula (1)



(1)

wherein

R^{11} indicates a $C_1 \sim C_{10}$ alkyl group, a phenyl group which may be substituted or may not be substituted, an alicyclic group which may be substituted or may not be substituted, a phenyl ($C_1 \sim C_2$) alkyl group, or a tri($C_1 \sim C_7$) hydrocarbon silyl group, and wherein the substituents for the alkyl group, the phenyl group, the alicyclic group or the phenyl alkyl group are selected from the group consisting of a halogen atom, a hydroxy group, a $C_2 \sim C_7$ acyloxy group, a $C_1 \sim C_7$ alkyl group which may be substituted with a halogen atom, a $C_1 \sim C_4$ alkoxy group which may be substituted with a halogen atom, a nitrile group, a carboxyl group, and a ($C_1 \sim C_6$) alkoxycarbonyl group,

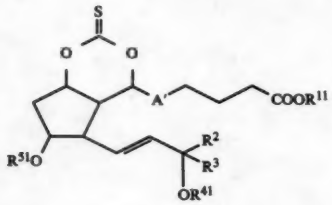
R^2 and R^3 are as defined hereinabove,

R^{41} indicates a group which forms an acetal bond together with an oxygen atom of a hydroxyl group,

R^{51} indicates a tri($C_1 \sim C_7$) hydrocarbon silyl group,

A' indicates a triple bond or a double bond,

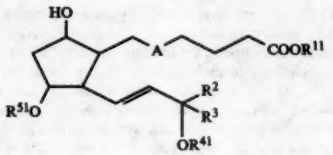
with thiocarbonyl diimidazole or thiocarbonyl diimidazole which is substituted by C_1 to C_6 alkyl groups such as naphthyl and ethyl; C_1 to C_6 alkoxy groups such as methoxy, ethoxy, and propoxy; or halogen atoms such as fluorine and chlorine to obtain a thiocarbonate body expressed by the following formula (2)



(2)

wherein R^{11}, R^2, R^3, R^{41}, R^{51}, and A^1 are as defined hereinabove,

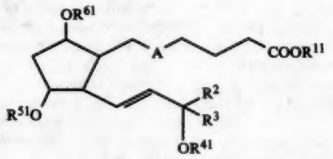
which is then subjected to the reaction to deoxidize the hydroxyl group at the 7-position, followed by the reduction of the triple bond or a double bond at the 5-position if needed to obtain a reduced type of compound, to give prostaglandin $F_2\alpha$ expressed by the following formula (3)



(3)

wherein A indicates a single bond, a double bond, or a triple bond; and R_{11}, R^2, R^3, R^{41}, and R^{51} are as defined hereinabove,

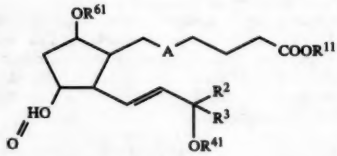
whose hydroxyl group at the 9-position is protected thereafter with a group which forms an acetal bond together with an oxygen atom of the hydroxyl group, to obtain protected prostaglandin $F_2\alpha$ expressed by the following formula (4)



(4)

wherein R^{61} indicates a group which forms an acetal bond together with an oxygen atom of the hydroxyl group; and R^{11}, R^2, R^3, R^{41}, R^{51}, and A are as defined hereinabove,

which is then subjected to the selective deprotection reaction of R^{51}, followed, if needed to obtain a reduced type of compound, by the reduction of the triple bond or the double bond at the 5-position, to obtain prostaglandin $F_2\alpha$ expressed by the following formula (5)



(5)

wherein R^{11}, R^2, R^3, R^{41}, R^{51} and A are as defined hereinabove,

which is then subjected to the oxidation reaction, followed, if necessary to obtain a reduced type of compound, by the reduction of the triple bond or the double bond at the 5-position, deprotection, hydrolysis and/or salt-forming reaction.

4,886,904

POLYPRENYL COMPOSITION OR COMPOUNDS AND PROCESS FOR THE PRODUCTION THEREOF

Yasuyuki Tanaka, Hachioji; Koichi Ibata; Masao Mizuno, both of Kurashiki; Yoichi Ninagawa, Hasaki, and Takashi Nishida, Kurashiki, all of Japan, assignors to Kuraray Co., Ltd., Okayama, Japan

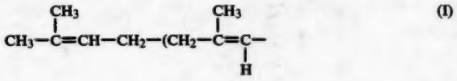
Division of Ser. No. 654,526, Sep. 24, 1984, which is a continuation-in-part of Ser. No. 371,487, Apr. 23, 1982, abandoned, which is a continuation-in-part of Ser. No. 324,636, Nov. 24, 1981. This application Aug. 5, 1987, Ser. No. 81,735

Claims priority, application Japan, Nov. 28, 1980, 65-168747

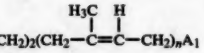
Int. Cl.[4] C07C *29/86, 33/02, 67/58, 69/007*

U.S. Cl. 560—249 10 Claims

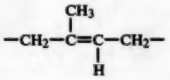
1. A polyprenyl composition consisting essentially of a mixture of polyprenyl compounds represented by the following formula:



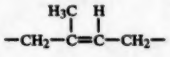
(I)



wherein A_1 represents a hydroxyl or acetyloxy group,



represents a transisoprene unit,



represents a cisisoprene unit, and n is an integer of from 11–19, said mixture containing, based on the total weight of the mixture, at least 20% by weight of the compound of formula (I) wherein n is 14, at least 30% by weight of the compound of formula (I) wherein n is 15, and at least 10% by weight of the compound of formula (I) wherein n is 16; the total amount of these three compounds being at least 70% by weight based on the weight of the mixture of the polyprenyl compound of formula (I) in which the integer n varies from 11–19.

4,886,905

PREPARATION OF ETHYL ACETATE

Thomas H. Larkins, Jr., Kingsport, Tenn., assignor to Eastman Kodak Company, Rochester, N.Y.

Continuation of Ser. No. 230,172, Jan. 30, 1981, abandoned. This application May 23, 1983, Ser. No. 497,477

Int. Cl.[4] C07C *67/00, 67/297, 69/14*

U.S. Cl. 560—265 4 Claims

1. Process for the preparation of ethyl acetate which comprises hydrogenating acetic anhydride at a pressure of about 500 to 2200 psig and a temperature of about 160 to 210° C. in the presence of a catalytic amount of a homogeneous ruthenium compound in the presence of about 0.25 to 1.5 weight percent methyl iodide based on the acetic anhydride and up to about 0.1 weight perent lithium iodide based on the weight of the acetic anhydride.

4,886,906

PROCESS FOR PRODUCING 2,6-NAPHTHALENE DICARBOXYLIC ACID

Toru Tanaka, and Masato Inari, both of Okayama, Japan, assignors to Mitsubishi Gas Chemical Company, Inc., Tokyo, Japan

Filed Jan. 6, 1989, Ser. No. 294,297

Claims priority, application Japan, Jan. 11, 1988, 63-2528

Int. Cl.[4] C07B *51/265;* C07C *51/245*

U.S. Cl. 562—416 11 Claims

1. A process for producing 2,6-naphthalene dicarboxylic acid which comprises oxidizing a 2-alkyl-6-acyl naphthalene with molecular oxygen-containing gas in the presence of a catalyst containing cobalt, manganese, bromine and at least one metal selected from the group consisting of iron, copper and mixtures thereof in an acetic acid solvent, the concentration of cobalt in the acetic acid solvent being in the range of 0.06–1% by weight, the concentration of manganese in the acetic acid solvent being in the range of 0.06–1.0% by weight and the concentration of bromine being in the range of 0.1–0.8% by weight; and when iron is used, the concentration of iron being in the range of 0.01–0.5% by weight; and when copper is used, the concentration of copper being in the range of 0.001–0.2% by weight, these percentages being in terms of elements.

4,886,907

POLYSUBSTITUTED DERIVATIVES OF NAPHTHALENE, THEIR PROCESS OF PREPARATION AND THEIR APPLICATION IN THE COSMETIC AND PHARMACEUTICAL FIELDS

Braham Shroot, Antibes; Jacques Eustache, Grasse, and Martine Bouclier, Antibes, all of France, assignors to Centre International De Recherches Dermatologiques C.I.R.D., Valbonne, France

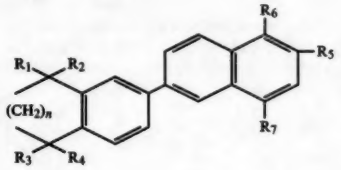
Division of Ser. No. 675,700, Nov. 28, 1984, Pat. No. 4,666,941. This application Apr. 17, 1987, Ser. No. 39,463

Claims priority, application France, Nov. 28, 1983, 83 18917

Int. Cl.[4] C07C *63/36*

U.S. Cl. 562—490 2 Claims

1. A polysubstituted naphthalene compound having the formula



wherein

$R_1=R_2=R_3=R_4=CH_3$,

n=2

R_7=H,

R_6=lower alkyl and

$R_5=CO_2H$,

and the salts of said compound.

4,886,908

METHOD OF PREPARING (R)-4-AMINO-3-HYDROXYBUTYRIC ACID

Johannes Haeusler, Vienna, Austria, assignor to Degussa Aktiengesellschaft, Frankfurt, Fed. Rep. of Germany

Filed Feb. 29, 1988, Ser. No. 161,941

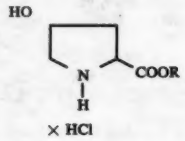
Claims priority, application Fed. Rep. of Germany, Mar. 11, 1987, 3707719

Int. Cl.[4] C07C *101/30;* C07D *207/12, 207/24, 207/273*

U.S. Cl. 562—567 10 Claims

1. A method for preparing (R)-4-amino-3-hydroxybutyric acid, comprising:

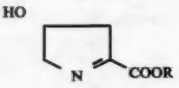
(a) reacting the compound (2S,4R)-4-hydroxyproline ester hydrochloride of the formula:



(I)

in which formula R is a methyl or ethyl group,

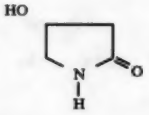
in a water-free medium with an alkali metal methoxide or alkali metal ethoxide as solution in the corresponding alcohol as an initial step, then treating with t-butyl hypochlorite for N-chlorination and finally treating with triethyl amine for dehydrochlorination to thereby obtain a compound (R)-4-hydroxy-1-pyrroline-2-carboxylic acid ester of the formula:



(II)

in which R again has the same meaning as above,

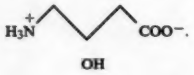
(b) thereafter dissolving said compound of formula II without further purification in an alkali metal hydroxide solution, adding to said solution hydrogen peroxide to obtain a reaction mixture, acidifying said reaction mixture by slowly adding a mineral acid, subsequently desalinating and isolating the resulting (R)-4-hydroxy-2-pyrrolidone of the formula:



(III)

by evaporation concentration and thereafter

(c) hydrolyzing said pyrrolidone III with a mineral acid to (R)-4-amino-3-hydroxybutyric acid of the formula:



(IV)

4,886,909

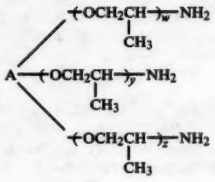
AROMATIC AMINE TERMINATED TRIFUNCTIONAL POLYOXYALKYLENE UREA

Jiang-Jen Lin, Round Rock, and George P. Speranza, Austin, both of Tex., assignors to Texaco Chemical Company, White Plains, N.Y.

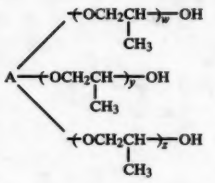
Filed Jul. 22, 1988, Ser. No. 222,696
Int. Cl.[4] C07C *127/19*
U.S. Cl. 564—50 **20 Claims**

1. A novel composition useful as an epoxy curing agent and also useful in reaction injection molding comprising an amine terminated trifunctional polyoxyalkylene urea which essentially consists of the product of the 2-step reaction of a:

(1) a compound from the group consisting of a triamine of the formula:



or a trifunctional polyether polyol of the formula:



wherein A represents the nucleus of an oxyalkylation susceptible trihydric alcohol containing about 3 to 6 carbon atoms and w, y and z are numbers and the average value of the sum of w, y and z is from about 10 to about 100; and

(2) an alkyl diisocyanate from the group consisting of isophorone diisocyanate, hexamethylenediisocyanate, toluenediisooyanate, methylenediphenyldiisocyanate and tetramethylxylene diisocyanate which form an intermediate product; and subsequently reacting the intermediate with

(3), a diprimary amine of the formula:

$$H_2N-R''-NH_2$$

wherein R'' represents an aromatic group having an average molecular weight of about 72 to about 500 and containing from about 6 to about 35 carbon atoms, in the presence of an alcohol solvent wherein the temperature for the first step where the triol is reacted is from about 50° C. to about 120° C. and for the second step where the prepolymer is reacted with a diamine the temperature is from about 0° C. to 50° C., and in the case where a trifunctional polyether polyol or lower molecular weight triamine is reacted with a diisocyanate the reaction takes place over a Group IVA metal catalyst, and subsequently combining the product of the two-step reaction with an excess of a substance selected from the group consisting of a diprimary amine or a triamine to form the epoxy curing agent.

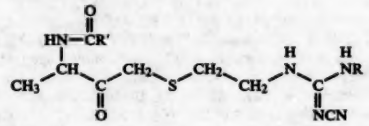
4,886,910

CYANOGUANIDINE DERIVATIVE AND PROCESS FOR PREPARATION THEREOF

Hiroaki Tan, Otake; Koji Kato, Waki; Junichi Imuta, Otake, and Noriaki Kihara, Iwakuni, all of Japan, assignors to Mitsui Petrochemical Industries, Ltd., Tokyo, Japan

Filed Feb. 17, 1988, Ser. No. 156,658
Claims priority, application Japan, Feb. 17, 1987, 62-32327
Int. Cl.[4] C07B *103/44*
U.S. Cl. 564—215 **4 Claims**

1. A cyanoguanidine derivative represented by the following general formula (I):



(I)

wherein R stands for a lower alkyl group and R′ for stands a hydrogen atom or a lower alkyl group.

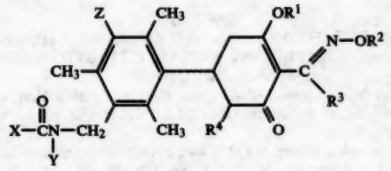
4,886,911

HERBICIDAL CYCLOHEXANE-1,3-DIONE DERIVATIVES

Keith G. Watson, Blackburn, and Craig G. Lovel, North Fitzroy, both of Australia, assignors to ICI Australia Limited, Melbourne, Australia

Filed Jun. 12, 1987, Ser. No. 61,306
Claims priority, application Australia, Jul. 1, 1986, PH6674
Int. Cl.[4] C07C *131/00*
U.S. Cl. 564—221 **5 Claims**

1. A compound of formula I



I

wherein:

X and Y are independently selected from the group consisting of hydrogen, C_1 to C_4 alkyl, and C_1 to C_4 haloalkyl;

Z is selected from the group consisting of hydrogen, halogen, C_1 to C_4 alkyl and C_1 to C_4 alkanoyl;

R_1 is selected from the group consisting of: hydrogen; an acyl group; and an inorganic or organic cation;

R^2 is selected from the group consisting of: C_1 to C_6 alkyl; C_2 to C_6 alkenyl; C_2 to C_6 haloalkenyl; C_2 to C_6 alkynyl; and substituted C_1 to C_6 alkyl wherein the alkyl group is substituted with a substituent selected from the group consisting of halogen, phenyl, and substituted phenyl wherein the benzene ring is substituted with from one to three substituents selected from the group consisting of halogen, and C_1 to C_6 alkyl;

R^3 is selected from the group consisting Of: C_1 to C_6 alkyl; and

R^4 is selected from the group consisting of: hydrogen; C_1 to C_6 alkyl; and (C_1 to C_6 alkoxy) carbonyl.

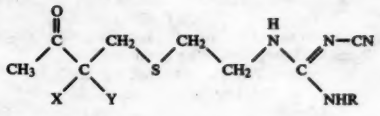
4,886,912

CYANOGUANIDINE DERIVATIVE AND PROCESS FOR PREPARATION THEREOF

Hiroaki Tan, Otake; Keiichi Yokoyama, and Noriaki Kihara, both of Iwakuni, all of Japan, assignors to Mitsui Petrochemical Industries, Ltd., Tokyo, Japan

Filed Feb. 17, 1988, Ser. No. 156,668
Claims priority, application Japan, Feb. 17, 1987, 62-32329
Int. Cl.[4] C07C *129/08*
U.S. Cl. 564—240 **2 Claims**

1. A cyanoguanidine derivative represented by the following general formula (I):



(I)

wherein X and Y, which may be the same or different, stand for a chlorine atom or a bromine atom, and R stands for a lower alkyl group.

4,886,913

PROCESS FOR PREPARING 2-METHYL-2-(METHYLTHIO) PROPIONALDEHYDE O-(METHYLCARBAMOYL) OXIME AS A WATER-WET CAKE

Constance A. Fellows, Durham; Patrick G. Hecht, and Steven B. Levin, both of Raleigh, all of N.C., assignors to Rhone-Poulenc Nederland, B.V., Amstelveen, Netherlands

Filed Jun. 27, 1986, Ser. No. 879,769
Int. Cl.[4] C07C *131/105*
U.S. Cl. 564—255 **18 Claims**

1. A process for preparing 2-methyl-2-(methylthio) propionaldehyde O-(methylcarbamoyl) oxime which comprises reacting 2-methyl-2-(methylthio) propionaldehyde oxime with methyl isocyanate in the presence of an aqueous medium for a period sufficient to form 2-methyl-2-(methylthio) propionaldehyde O-(methylcarbamoyl) oxime.

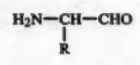
4,886,914

PROCESS FOR SYNTHESIS OF ALPHA AKLYL AMINO ALDEHYDES

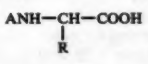
Bertrand Castro, Perols, and Jean Fehrentz, Montpellier, both of France, assignors to Sanofi, Paris, France

Continuation of Ser. No. 516,709, Jul. 25, 1983, abandoned. This application Jul. 30, 1985, Ser. No. 760,524
Claims priority, application France, Jul. 30, 1982, 82 13385
Int. Cl.[4] C07C *95/08*
U.S. Cl. 564—343 **12 Claims**

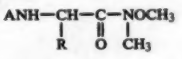
1. A process for preparing alpha alkyl amino aldehydes of formula:



in which R is a straight or branched alkyl group or an aralkyl group which may be substituted by at least one hydroxy, thiol or NHR′ group, R′ being H or an alkyl group, which process comprises the steps of reacting an activated ester of an amino acid of formula:



in which the amine functions have been reversibly blocked by a blocking group A, with N,O-dimethyl hydroxylamine in a basic medium to obtain a product of formula:



and reducing the product thus obtained by a reduction reaction using a hydride.

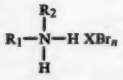
4,886,915

WATER SOLUBLE ORGANIC AMMONIUM PER HALIDES

Nicolai A. Favstritsky, Lafayette, Ind., assignor to Great Lakes Chemical Corporation, West Lafayette, Ind.

Filed Jun. 24, 1988, Ser. No. 211,362
Int. Cl.[4] C07C 87/22, 91/04
U.S. Cl. 564—503 6 Claims

1. Water soluble ammonium perhalides of the formula:



where R_1 and R_2 are independently hydrogen, hydroxyethyl, alkyl, cycloalkyl, alkyl ether, polyoxyalkylene, and halogenated alkyl; X is chlorine, bromine or iodine; n is 2 to 6; and only one of R_1 and R_2 may be hydrogen.

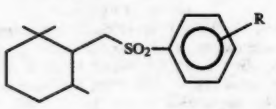
4,886,916

PROCESS FOR PREPARING SULFONE COMPOUNDS

Takashi Onishi; Shigeaki Suzuki; Toshiki Mori; Hiroshi Fujii, all of Kurashiki, and Yoshiji Fujita, Yokohama, all of Japan, assignors to Kuraray Company, Ltd., Okayama, Japan

Filed Mar. 15, 1988, Ser. No. 168,408
Claims priority, application Japan, Mar. 17, 1987, 62-63414; Mar. 17, 1987, 62-63415
Int. Cl.[4] C07C 147/02, 147/04
U.S. Cl. 568—34 12 Claims

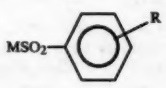
10. A process preparing for a cyclogeranyl sulfone of the following formula (II)



(II)

wherein, R is a hydrogen atom or a lower alkyl group, and a double bond exists at either one of the dotted positions, which comprises the steps of:

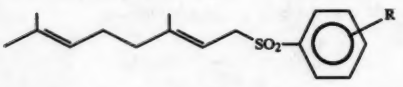
(1) reacting a compound selected from the group consisting of geranyl chloride, neryl chloride, and linalyl chloride, with a phenyl sulfinate of the following formula (III),



(III)

wherein, R is a hydrogen atom or a lower alkyl group, and M is sodium atom or potassium atom, in the presence of (i) tetralkylammonium iodide in an anhydrous condition, or (ii) a zinc halide and an iodide compound; and

(2) cyclizing an allylic sulfone of the following formula (I),



(I)

wherein, R is a hydrogen atom or a lower alkyl group, and containing both cis and trans isomers obtained in step (1) in the presence of an acid catalyst.

4,886,917

ALKOXYLATION USING CALCIUM CATALYSTS AND PRODUCTS THEREFROM

Robert J. Knopf, St. Albans, and Louis F. Theiling, Jr., Charleston, both of W. Va., assignors to Union Carbide Chemicals and Plastics Company Inc., Danbury, Conn.

Division of Ser. No. 621,991, Jun. 22, 1984, abandoned, which is a continuation-in-part of Ser. No. 510,804, Jul. 5, 1983, abandoned. This application Oct. 6, 1986, Ser. No. 916,015
Int. Cl.[4] C07C 43/11, 43/04
U.S. Cl. 568—623 31 Claims

1. An alkoxylation product mixture resulting from the reaction of an organic compound having at least one active hydrogen with an epoxide in which the mole ratio of reacted epoxide per active hydrogen is at least about 4 characterized by having at least one alkoxylation moiety which constitutes about 20 to 40 weight percent of the mixture; the weight percent of the mixture having three or more oxyalkylene units than the average peak alkoxylation specie is less than about 12 weight percent of the mixture; the alkoxylation specie having one oxyalkylene group more than that of the most prevalent specie and the alkoxylation specie having one oxyalkylene group less than that of the most prevalent specie are present in a weight ratio to the most prevalent specie of about 0.6:1 to 1:1.

4,886,918

OLEFIN HYDRATION AND ETHERIFICATION PROCESS EMPLOYING SERIALLY STAGED OLEFIN INTRODUCTION

Charles M. Sorensen, Wilmington, Del., and Philip Varghese, Voorhees, N.J., assignors to Mobil Oil Corporation, New York, N.Y.

Continuation of Ser. No. 270,406, Nov. 7, 1988, abandoned, which is a continuation of Ser. No. 150,187, Jan. 29, 1988, abandoned. This application May 3, 1989, Ser. No. 346,261
Int. Cl.[4] C07C 41/05, 41/09
U.S. Cl. 568—697 25 Claims

1. A process for producing ether(s) or mixture of ether(s) and alcohol(s) which comprises:

(a) introducing a feed containing a substantial amount of at least one light olefin into an olefin conversion unit possessing first and second interconnected reaction zones, said feed being introduced into each of said first and second reaction zones at at least one point of entry therein, said first and second reaction zones each containing a quantity of shape-selective acidic zeolite catalyst;

(b) introducing water into the first reaction zone and maintaining the zone under conditions conducive to the reaction of light olefin with water to produce alcohol therein;

(c) introducing at least a portion of the alcohol produced in the first reaction zone into the second reaction zone and maintaining the second reaction zone under conditions conducive to the dehydration of alcohol and the reaction of alcohol with light olefin to produce essentially pure ether or ether in admixture with alcohol therein.

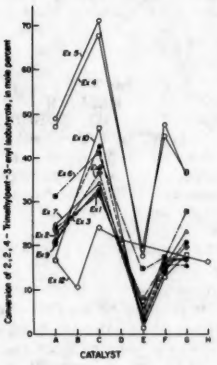
4,886,919

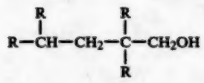
PROCESS FOR THE PRODUCTION OF SATURATED NEO-ALCOHOLS

Ernesto Vera-Castaneda, Webster, and John E. Logsdon, Houston, both of Tex., assignors to Union Carbide Chemicals and Plastics Company Inc., Danbury, Conn.

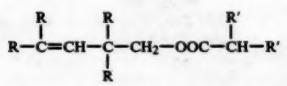
Filed Nov. 25, 1987, Ser. No. 125,222
Int. Cl.[4] C07C 29/136, 31/12, 31/125
U.S. Cl. 568—885 7 Claims

1. A process for production of saturated alcohols of the formula:

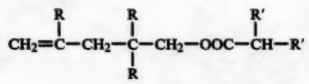




by the catalytic hydrogenation of unsaturated monoesters of the formulas:



wherein, when an R group on the enyl group is methyl said unsaturated monoester may include the isomeric form of



which comprises hydrogenating said unsaturated monoesters in the vapor phase with hydrogen at a temperature of from about 100° C. to about 250° C. at a pressure of from about 2 atmospheres to about 50° atmospheres in contact with the reduced form of a catalyst consisting of an oxides mixture represented by:

$$Zn_1Cu_bX_cNi_dO_e$$

wherein

(a) has a value of about 30 to about 75,
(b) has a value of about 35 to about 60,
(c) has a value of zero to about 15,
(d) has a value of about 0.3 to about 2,
(e) has a value sufficient to satisfy the oxides needs of the metal atoms,

and the sum of (a) plus (b) plus (c) plus (d) is equal to 100, and X is of at least one other metal atom selected from aluminum and alkali metal atoms and wherein R represents the same or different monovalent hydrocarbyl group selected from (i) an alkyl group having from 1 to about 8 carbon atoms, (ii) an alkyl group having from 1 to about 8 carbon atoms, (ii) a cycloalkyl group having 5 or 6 ring carbon atoms, or (iii) an aryl, alkaryl or aralkyl group in which the aromatic ring is phenyl or naphthyl, and R' is hydrogen or an R group.

4,886,920

PROCESS FOR PREPARING AROMATIC FLUORIDES

Gary L. Cantrell, Belleville, Ill., assignor to Mallinckrodt, Inc., St. Louis, Mo.

Continuation-in-part of Ser. No. 34,351, Apr. 6, 1987, abandoned. This application Apr. 5, 1988, Ser. No. 177,986

Int. Cl.[4] C07C *17/22, 25/13, 25/18;* C07D *213/02*

U.S. Cl. 570—141 **15 Claims**

1. In a diazotization-fluorination process for preparing an aromatic fluoride from a corresponding diazotizable aromatic primary amine wherein (A) the amine is diazotized in a reaction mixture comprising (i) a reaction medium consisting essentially of hydrogen fluoride, (ii) said amine and (iii) a nitrosonium ion-containing or -generating diazotizing agent under reaction conditions such that the resulting reaction mixture comprising the resulting aromatic diazonium fluoride further comprises one or more oxidizing agents, whereby said resulting reaction mixture produces oxidant-indicating blue color on test paper impregnated with starch and potassium iodide, and (B) the aromatic diazonium fluoride is decomposed at elevated temperature in said resulting reaction mixture to nitrogen and the aromatic fluoride, the improvement which comprises, prior to decomposing said diazonium fluoride, adding to said resulting mixture a member selected from the group consisting of hydrazine, aromatic hydrazine, semicarbazide, thiosemicarbazide, acid salts thereof, sulfur dioxide, sodium sulfite, and sodium bisulfite, said member being added in an amount effective to reduce the oxidation potential of said resulting mixture and substantially decompose said agent.

4,886,921

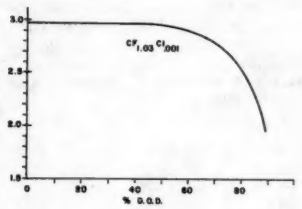
SYNTHESIS OF CARBON FLUORIDE AND CARBON FLUORIDE CHLORIDE

David Nalewajek, West Seneca, N.Y., assignor to Allied-Signal Inc., Morris Township, Morris County, N.J.

Filed Apr. 18, 1988, Ser. No. 182,637

Int. Cl.[4] C07C *17/20, 19/08*

U.S. Cl. 570—170 **10 Claims**



1. A method of preparing fluorinated carbon compositions selected from the group consisting of CF_x and $(C_yF_xCl_z)_n$ wherein x has a value of about 0.7 to 1.2, y has a value of about 1, n has a value of about 1 to about 100,000 and z has a value of less than about 0.1 which comprises contacting a carbon fluoride chloride compound of the formula

$$(C_yF_xCl_z)_n$$

wherein x is less than 0.7, y is less than or equal to 1 and z is less than about 0.1 with a fluorine gas blended with an inert diluent gas in the absence of chlorine gas, at an elevated temperature not in excess of about 450° C.

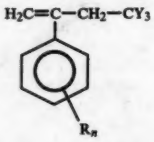
4,886,922

CATALYST FOR DEHYDROHALOGENATION

Dennis K. Klipa, Midland, and James R. Dewald, Bay City, both of Mich., assignors to The Dow Chemical Company, Midland, Mich.

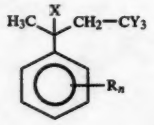
Filed Sep. 14, 1984, Ser. No. 650,915
Int. Cl.[4] C07C *17/34*
U.S. Cl. 570—193 **28 Claims**

1. The method for preparing an α-substituted styrene of the formula



wherein R represents halogen, hydrogen, alkyl, haloalkyl, polyhaloalkyl or substituted alkyl; n is 0 to the maximum number of remaining available position on the aromatic ring; and each Y independently represents halogen;

comprising contacting a catalyst consisting essentially of dried γ-alumina with an α-haloalkylbenzene of the formula



wherein X is halo, and R_n and Y are defined as hereinbefore, said γ-alumina serving to catalyze the dehydrohalogenation of said α-haloalkylbenzene to said α-substituted styrene.

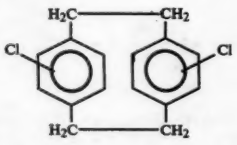
4,886,923

PROCESS FOR THE PREPARATION OF TRICYCLO 8.2.2.2 HEXADECA 4,6,10,12,13,15 HEXAENE CHLORINATED IN THE BENZENE RINGS

Raffaele Ungarelli, Novara; Maurizio A. Beretta, Milan, and Loris Sogli, Novara, all of Italy, assignors to Montedison S.p.A., Milan, Italy

Filed Sep. 16, 1988, Ser. No. 245,325
Claims priority, application Italy, Sep. 18, 1987, 21955 A/87
Int. Cl.[4] C07C *17/12, 25/18*
U.S. Cl. 570—210 **9 Claims**

1. A process for preparing a chlorinated (2,2)-paracyclophane having formula II:



(II)

comprise subjecting (2,2)-paracyclophane (PCP) to gaseous chlorination in a halogenated organic suspending or solvent medium and in the presence of at least one metal chloride catalyst having formula IV:

Me—Clp (UV)

where Me is selected from the group consisting of Fe, Sb, Al, I, Cu and Sn and p represents an integer from 1 to 5 and in the presence of at lesst one co-catalyst having formula R—OH, where R represents a hydrocarbyl or alkylcarboxylic radical, having a linear or a branched chain, containing from 1 to 6 C atoms, the temperature being substantially from −70° C. to 100 ° C., the pressure being substantially at an atmospheric level and the chlorine: (PCP) ratio being equal to or lower than 0.7 by weight.

4,886,924

STEREOSPECIFIC SYNTHESIS OF [e]-ALKENES FROM ENAMINES VIA HYDROBORATION

Christian T. Goralski, Midland, Mich.; Bakthan Singaram, and Herbert C. Brown, both of West Lafayette, Ind., assignors to The Dow Chemical Company, Midland, Mich.

Filed Oct. 17, 1988, Ser. No. 258,743
Int. Cl.[4] C07C *1/32*
U.S. Cl. 585—318 **11 Claims**

1. A process for preparing an [E] isomer of an alkene comprising three essential steps of

(1) reacting an enamine wherein the enamine has an alkene portion corresponding to an alkene selected from the group consisting of C_{3-100} linear alkenes and C_{12-100} cyclic alkenes with a hydroborating agent under reaction conditions sufficient to form an intermediate organoborane;

(2) reacting the organoborane formed in step (1) with an esterifying agent under reaction conditions sufficient to form a boronic ester; and

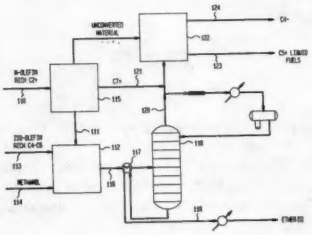
(3) oxidizing the boronic ester formed in step (2) in the presence of hydrogen peroxide and in the absence of added base under reaction conditions sufficient to form the [E] isomer of the alkene corresponding to the alkenyl portion of the enamine starting material.

4,886,925

OLEFINS INTERCONVERSION AND ETHERIFICATION PROCESS

Mohsen N. Harandi, 12 Catbird Ct., Lawrenceville, N.J. 08648

Filed May 2, 1988, Ser. No. 189,450
Int. Cl.[4] C07C *1/20, 2/00*
U.S. Cl. 585—331 **13 Claims**



1. a process for producing liquid fuel mixtures from olefin feedstock and lower alcohols by multistage etherification, olefin interconversion and oilgomerization reactions, comprising the steps of:

(a) contacting an olefinic hydrocarbon feedstock rich in C_{2+} n-alkenes with acidic, medium pore metallosilicate particles in an olefin interconversion zone under mild olefin interconversion conditions between 200 and 400° C. whereby a first effluent stream comprising C_4–C_6 alkenes rich in isoalkenes, a second stream comprising C_7+ olefinic gasoline boiling range hydrocarbons and a third stream comprising unconverted hydrocarbons are produced;

(b) reacting said first stream with lower aliphatic alcohol in the presence of an acid etherification catalyst under reaction conditions effective to produce a mixture of tertiary alkyl ethers;

(c) recovering the resulting reaction effluent containing tertiary alkyl ethers, C_5+ gasoline range hydrocarbons, and a light hydrocarbon fraction containing unreacted alkenes and unreacted alcohol;

(d) recovering said light hydrocarbon fraction containing said unreacted alkenes from the reaction effluent of step (c) along with said unreacted alcohol;

(e) contacting the recovered light hydrocarbon containing alcohol fraction from step (d) and step (a) second and third stream with an acid oligomerization and oxygenate conversion catalyst to convert at least a portion of said unreacted alkenes and alcohol to heavier liquid hydrocarbon product, including $C_{10}+$ distillate range hydrocarbons, aromatics and or C_5–C_9 gasoline boiling range hydrocarbons.

4,886,926

CATALYTIC DEHYDROGENATION OF HYDROCARBONS OVER TIN-CONTAINING CRYSTALLINE MICROPOROUS MATERIALS

Ralph M. Dessau, Edison, N.J.; Ernest W. Valyocsik, Yardley, and James C. Vartuli, West Chester, both of Pa., assignors to Mobil Oil Corporation, New York, N.Y.

Filed Jun. 24, 1988, Ser. No. 210,947

Int. Cl.[4] G07C *2/64, 5/333*

U.S. Cl. 585—444 **40 Claims**

1. A process for producing an unsaturated analog from a compound containing an aliphatic moiety of 2 to 5 carbon atoms consisting essentially of contacting, under dehydrogenation conditions, a feed selected from the group consisting of said compound; said compound admixed with hydrogen; said compound admixed with a diluent inert to dehydrogenation conditions; and said compound admixed with hydrogen and said diluent; with a non-acidic catalyst wherein said catalyst consists essentially of a dehydrogenation metal and a non-acidic microporous material containing tin; wherein said microporous material is isostructural with a zeolite and contains aluminum in an amount less than 0.1 weight percent, wherein the amount of dehydrogenation metal comprises 0.01 to 30 weight percent of the composition and the amount of tin ranges from about 0.05 to 20 weight percent of the composition; and producing as a product said unsaturated analog.

4,886,927

PROCESS FOR ISOMERIZATION OF ALKYLAROMATICS

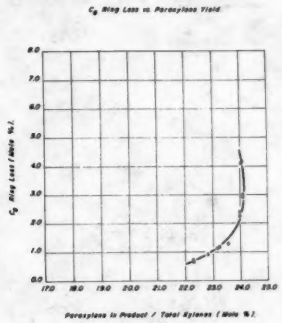
J. W. Adriaan Sachtler, Des Plaines; R. Joe Lawson, Palatine, and Susan L. Lambert, Rolling Meadows, all of Ill., assignors to UOP, Des Plaines, Ill.

Division of Ser. No. 109,019, Oct. 16, 1987, abandoned. This application Dec. 8, 1988, Ser. No. 281,424

Int. Cl.[4] C07C *5/22*

U.S. Cl. 585—48.1 **3 Claims**

1. A process for the isomerization of a non-equilibrium feed mixture of xylenes containing ethylbenzene comprising contacting the feed mixture in the presence of hydrogen at isomerization process conditions with a catalyst comprising at least one Group VIII metal component, a gallium-substituted zeolite having an x-ray diffraction pattern equivalent to ZSM-5, and a zirconia-alumina matrix.



4,886,928

HYDROCARBON DEHYDROGENATION PROCESS

Tamotsu Imai, Mt. Prospect, and Robert J. Schmidt, Rolling Meadows, both of Ill., assignors to UOP, Des Plaines, Ill.

Filed Sep. 26, 1988, Ser. No. 249,057

Int. Cl.[4] C07C *5/333, 4/02, 2/64*

U.S. Cl. 585—660 **16 Claims**

1. A process for dehydrogenating dehydrogenatable hydrocarbons by contacting a feedstock comprising dehydrogenatable hydrocarbons and steam at dehydrogenation conditions, with a dehydrogenation catalyst comprising an inorganic oxide carrier and catalytically effective amounts of a platinum group component, a first modifier component selected from the group scandium, yttrium, and actinium, a second modifier component selected from the group tin, lead, and germanium, and a halogen component and recovering the products of the process.

4,886,929

SEPARATION OF PARA-XYLENE

Richard W. Neuzil, Downers Grove, and George J. Antos, Bartlett, both of Ill., assignors to UOP Inc., Des Plaines, Ill.

Filed Jun. 15, 1987, Ser. No. 61,948

Int. Cl.[4] C07C *7/12, 7/13*

U.S. Cl. 585—828 **19 Claims**

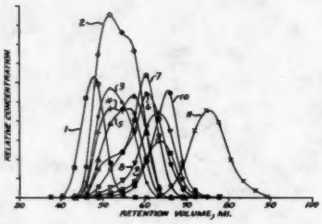
1. A process for separating the para-isomers of a dialkyl-substituted aromatic hydrocarbon from a mixture of said para-isomer and at least one other isomer of said aromatic hydrocarbon which process comprises contacting said mixture with a crystalline aluminosilicate adsorbent containing barium and potassium at exchangeable cationic sites within the adsorbent crystalline structure in a BaO/K_2O molar ratio of from about 0.6 to 1.2 at adsorption conditions selected to effect the adsorption of said para-isomer by said adsorbent and subsequently contacting said adsorbent with a desorbent material comprising a difluorobenzene selected from the group consisting of meta-difluorobenzene and ortho-difluorobenzene and mixtures thereof at desorption conditions to effect the removal of said para-isomer from said adsorbent and recovering from said adsorbent a stream concentrated in said para-isomer.

4,886,930

ZEOLITIC PARA-XYLENE SEPARATION WITH TETRALIN HEAVY DESORBENT

Hermann A. Zinnen, Evanston, Ill., assignor to UOP, Des Plaines, Ill.

Filed May 23, 1988, Ser. No. 197,787
Int. Cl.[4] C07C 7/12
U.S. Cl. 585—828 12 Claims



1. A process for separating p-xylene from a mixture comprising p-xylene, at least about 0.1 wt. % C_9 aromatic hydrocarbons and at least one other isomer of xylene which process comprises contacting said mixture with an adsorbent crystalline aluminosilicate containing a Group IA or IIA metal ion at exchangeable cationic sites at adsorption conditions to effect the selective adsorption of said p-xylene by said adsorbent and to produce a raffinate stream comprising the less strongly adsorbed C_9 hydrocarbons and said other xylene isomers and contacting said adsorbent with a desorbent comprising 1,2,3,4-tetrahydronaphtalene at desorption conditions to effect the removal of p-xylene from said adsorbent as an extract stream.

4,886,931

UPGRADING LOW MOLECULAR WEIGHT HYDROCARBONS

Joseph P. Bartek, Highland Hts.; James F. Brazdil, Jr., Mayfield Hts.; John M. Hupp, University Hts., and Robert K. Grasselli, Aurora, all of Ohio, assignors to The Standard Oil Company, Cleveland, Ohio

Filed Jun. 4, 1987, Ser. No. 58,016
Int. Cl.[4] C07C 2/00
U.S. Cl. 585—500 19 Claims

1. A process for the conversion of low molecular weight alkanes to higher molecular weight hydrocarbons comprising contacting said low molecular weight alkanes, at an elevated temperature, with oxygen and a catalyst of the formula

$$Zn_aA_bM_cM'_dO_x$$

wherein

A is Li, Na, K, or mixtures thereof;

M is Al, Ga, Cr, La, Y, Sc, V, Nb, Ta, Cu or mixtures thereof;

M' is Cs, Rb, Mg, Ca, Sr, Ba, Sm, Pb, Mn, Sb, P, Sn, Bi, Ti, Zr, Hf, or mixtures thereof;

a is from about 1 to about 20;

b is from about 0.1 to about 20;

c is from about 0 to about 5;

d is from about 0 to about 20; and

x is a number needed to fulfill the valence requirements of the other elements; provided that

(i) at least one of c and d is at least 0.1; and

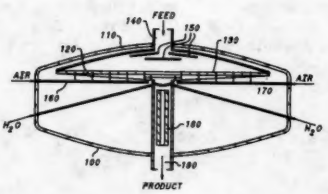
(ii) when M' is Sn, c must be at least 0.1.

4,886,932

THIN BED COFEED REACTION SYSTEM FOR METHANE CONVERSION

David W. Leyshon, West Chester, Pa., assignor to Atlantic Richfield Company, Los Angeles, Calif.

Continuation-in-part of Ser. No. 31,496, Mar. 30, 1987, which is a continuation-in-part of Ser. No. 158,128, Mar. 4, 1988. This application Apr. 11, 1988, Ser. No. 179,614
Int. Cl.[4] C07C 2/00
U.S. Cl. 585—500 8 Claims



1. In a method for the oxidative conversion reaction of methane to higher hydrocarbon products and coproduct water wherein a gas mixture comprising methane and a gaseous oxidant is contacted with a solid contact agent at reaction conditions in a thin adiabatic reactor bed, the improvement which comprises feeding to said reactor a gas mixture containing 1 to 10 wt % C_2+ alkanes based on the methane plus C2+ alkanes in the feed.

2. In a method for the oxidative conversion reaction of methane to higher hydrocarbon products and coproduct water wherein a gas mixture comprising methane and a gaseous oxidant is contacted with a solid contact agent in a thin adiabatic reactor bed at reaction conditions, comprising the steps of:

(1) initially heating the gas mixture to reaction temperature, causing an exothermic reaction in the thin adiabatic reactor bed;

(2) thereafter passing the said gas mixture at a temperature at least 100° C. less than reaction temperature into said thin adiabatic reactor bed and heating the gas mixture to reaction temperature by conductive flow of heat generated by said exothermic reaction axially through said bed countercurrent to the flow of said gas mixture; and removing a reaction mixture containing said higher hydrocarbons from said bed; the improvement which comprises feeding a mixture containing 1–10 wt % C_2+ alkanes based on the methane plus C_2+ alkanes in the feed to said thin bed adiabatic reactor.

4,886,933

PRODUCTION OF LINEAR ALPHA-OLEFINS

Yasushi Shiraki, and Takao Tamura, both of Tokuyama, Japan, assignors to Idemitsu Petrochemical Co., Ltd., Tokyo, Japan

Filed Jul. 20, 1988, Ser. No. 221,724
Claims priority, application Japan, Feb. 15, 1988, 63-30840
Int. Cl.[4] C07C 2/02
U.S. Cl. 585—522 11 Claims

1. In a method for the production of α-olefin compounds by the oligomerization of ethylene in presence of a catalyst system which is a mixture composed

(A) a zirconium halide compound represented by the general formula

$$ZrX_aA_{4-a}$$

in which X and A, which may be the same or different from each other, are each an atom of a halogen selected from the group consisting of chlorine, bromine and iodine and

the subscript a is zero or a positive integer not exceeding 4;

(B-a) a first alkyl aluminum compound represented by the general formula

$$AlR_{1.5}Q_{1.5}$$

in which R is an alkyl group having 1 to 20 carbon atoms and Q is an atom of a halogen selected from the group consisting of chlorine, bromine and iodine, R and Q each optionally being a combination of two kinds or more of the alkyl groups and halogen atoms, respectively; and

(B-b) a second alkyl aluminum compound represented by the general formula

$$AlR'_bQ'_{3-b}$$

in which R' is an alkyl group having 1 to 20 carbon atoms, Q' is an atom of a halogen selected from the group consisting of chlorine, bromine and iodine, R' and Q' each optionally being a combination of two kinds or more of the alkyl groups and halogen atoms, respectively, and b is 1, 2 or 3, and a ligand compound selected from the group consisting sulfur compounds, phosphorus compounds and nitrogen compounds improvement which comprises using a catalyst system compound of the components (A), (B-a) and (B-b) and prepared by a procedure in which:

(1) the concentration of the zirconium halide compound as the component (A) is in the range from 40 to 140 m moles per liter of the solvent;

(2) the temperature for the preparation of the catalyst system is in the range from 40° to 75° C. when the solvent is an aromatic hydrocarbon compound or in the range from 50° to 80° C. when the solvent is an alicyclic hydrocarbon compound;

(3) the length of time for the preparation of the catalyst system is in the range from 30 minutes to 8 hours; and

(4) the components (A), (B-a) and (B-b) are introduced in such an order that the second alkyl aluminum compound as the component is first introduced, then the zirconium halide compound as the component (A) is introduced and the first alkyl aluminum compound as the component (B-a) is lastly introduced.

4,886,934

PROCESS FOR THE CONVERSION OF A HYDROCARBONACEOUS FEEDSTOCK

Ian E. Maxwell, and Johannes K. Minderhoud, both of Amsterdam, Netherlands, assignors to Shell Oil Company, Houston, Tex.

Filed Feb. 27, 1989, Ser. No. 315,754

Claims priority, application United Kingdom, Jun. 16, 1988, 8814292

Int. Cl.[4] C07C *5/333*

U.S. Cl. 585—660 **8 Claims**

1. In a process for the conversion of paraffins contained in a gas oil or a vacuum gas oil to olefins wherein said gas oil or vacuum gas oil has a nitrogen content of at least 25 ppmw and at least 50 percent of said gas oil or vacuum gas oil boils at a temperature of 330° C. or greater which process comprises contacting said gas oil or vacuum gas oil with a zeolite catalyst having a pore diameter of 0.5 to 0.7 nm at a temperature of from 280° to 450° C., a pressure of from 1 to 10 bar, a catalyst to feedstock weight ratio of from 1 to 25 over a period of time, the improvement which consists of limiting the time of contact of the gas oil or vacuum gas oil with the catalyst to from 0.1 to less than 10 seconds.

4,886,935

NI/CU ABSORBENT/CATALYST FOR DESULFURIZATION AND ISOMERIZATION OF N-PARAFFINS

Peter Kokayeff, Fullerton, and Suheil F. Abdo, Diamond Bar, both of Calif., assignors to Union Oil Company of California, Los Angeles, Calif.

Continuation-in-part of Ser. No. 74,294, Jul. 16, 1987, Pat. No. 4,827,076. This application Aug. 31, 1988, Ser. No. 238,779

Int. Cl.[4] C07C *5/13*

U.S. Cl. 585—737 **53 Claims**

1. A process for desulfurizing and catalytically isomerizing a hydrocarbon feedstock containing sulfur components and normal paraffin compounds, said process comprising successively contacting a dual-function catalyst comprising at least one active non-noble Group VIII metal component and at least one active Group IB metal component in combination with at least one acidic component with said feedstock in a first reaction zone under conditions for simultaneously absorbing said sulfur components and isomerizing said normal paraffins to produce an effluent containing less than 5 ppmw of said sulfur components, calculated as S, and an increased amount of isomers of said normal paraffins, and, subsequently contacting said effluent from said first reaction zone with an isomerization catalyst comprising a crystalline molecular sieve under isomerization conditions including a temperature from about 50° F. to about 600° F. in a second reaction zone to produce a hydrocarbon product containing a reduced amount of said normal paraffin compounds compared to that contained in said effluent from said first reaction zone.

4,886,936

PROCESS FOR THE PRODUCTION OF ORTHO-NITROBENZONITRILES

Stephen E. Dinizo, San Lorenzo, Calif., assignor to ICI Americas Inc., Wilmington, Del.

Filed Aug. 15, 1988, Ser. No. 231,921

Int. Cl.[4] C07C *121/78*

U.S. Cl. 558—343 **9 Claims**

1. A process for the production of an ortho-nitrobenzonitrile by reaction of the corresponding ortho-nitrochlorobenzene with:

(a) cuprous cyanide and a metal bromide selected from alkali metal bromides, alkaline earth metal bromides, and zinc bromide, or

(b) lithium cyanide and cuprous bromide.

4,886,937

METHOD FOR TRANSFORMING PINE

Ronald R. Sederoff, Albany, Calif.; Anne-Marie Stomp, Wendell, N.C.; Larry W. Moore, Corvallis, Oreg., and Scott W. Chilton, Raleigh, N.C., assignors to North Carolina State University, Raleigh, N.C.

Continuation of Ser. No. 735,669, May 20, 1985, abandoned. This application Jun. 22, 1988, Ser. No. 211,149

Int. Cl.[4] A01H *1/04*; C12N *15/00*

U.S. Cl. 800—1 **16 Claims**

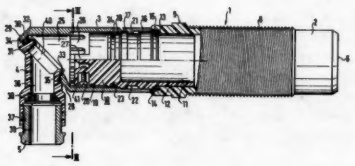
1. A method for transforming pine, comprising inoculating differentiated pine tissue with a strain of *Agrobacterium tumefaciens* selected from the group consisting of (i) a strain containing a Ti plasmid which is capable of causing crown gall in said pine, (ii) a strain containing a plasmid comprising the vir region of said Ti plasmid and TDNA borders, and (iii) a strain containing a first plasmid comprising the vir region of said Ti plasmid and a second plasmid comprising TDNA borders.

ELECTRICAL

4,886,938
ARRANGEMENT FOR LEADING A CABLE INTO A HOUSING

Werner Rottmar, Lörrach, and Klaus Schmidt, Schopfheim, both of Fed. Rep. of Germany, assignors to Endress u. Hauser GmbH u. Co., Fed. Rep. of Germany

Filed Aug. 25, 1987, Ser. No. 89,351
Int. Cl.[4] H05K *5/00, 17/945;* H01H *36/00*
U.S. Cl. 174—52.1 **9 Claims**

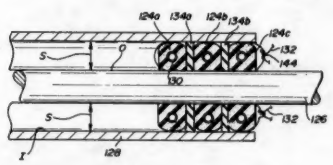


1. Arrangement for leading a cable into a housing which comprises a first housing part accommodating electrical components and carrying an axially extending connection part having connection elements for the cable conductors, a cap-like second housing part enclosing said connection elements, and a third housing part attached to said second housing part for introduction of said cable into said second housing part, in which arrangement said cap-like second housing part encloses said axially extending connection part in a sliding fit and comprises a detent engaging a circumferential groove in said connection part whereby said cap-like second housing part is held against axial displacement but can be detected by axial withdrawal from said connection part upon disengagement of said detent, and in which arrangement said cap-like second housing part comprises at its inner face at least one axial groove and said connection part comprises at least one protrusion which engages into said axial groove, whereby said cap-like second housing part is fixed on said connection part in a predetermined angular position.

4,886,939
CABLE SEALING DEVICE AND METHOD

Frank R. Kinnan, Camas Valley, Oreg., assignor to Conductron Corporation, Milford, N.H.

Filed Sep. 6, 1988, Ser. No. 241,064
Int. Cl.[4] H02G *15/08*
U.S. Cl. 174—77 R **16 Claims**



2. A sealing kit having component parts therein capable of being utilized in the field to seal the duct about an elongate object extending therethrough, said kit comprising:

(a) a predetermined length of reinforced, conforming and compressible material to be cut into one or more lengths, each less than said predetermined length, for placement about said elongate object within said duct;

(b) a plurality of bundling straps each having a body portion and a locking head portion by which the body portion may be looped about each of said lengths of reinforced, conforming the compressible material when positioned about said elongate object within said duct, drawn into the locking head portion and said loop reduced in size for compressing said compressible material lengths when fastened; and

(c) a sealing compound for placement upon the compressible material lengths to fill the space between said material and said duct and said elongate object when said lengths of compressible material are compressed by the fastening of said binding material.

3. A seal for sealing a duct about an elongate object extending therethrough comprising a first collar of reinforced, conforming and compressible material adapted to be placed about said elongate object and in contact with at least a portion of the inner surface of said duct to substantially fill such interspace;

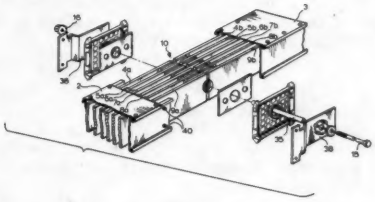
at least a second collar of reinforced, conforming and compressible material adapted to be placed about said elongate object and in contact with at least a portion of the inner surface of said duct to substantially fill such interspace; and

a plurality of elongate compression means, each wrapped about said first and said second collars which when manipulated cause said first and second collars when installed to compress in a direction along the length of said elongate object while each expands in a plane perpendicular to the length of said elongate object to increase the contact between said first and said second collars and the inner surface of said duct and the outer surface of said elongate object to substantially seal the duct about said elongate object adjacent said first and second collars.

4,886,940
BUS DUCT JOINT

Claude Gagnon, St-Jean-Sur-Ri; Claude Gelineau, Carignan; Pierre Raymond, St-Jean; Zygmunt P. Krzelowski, Iberville, and George Galletly, Burlington, all of Canada, assignors to Westinghouse Canada Inc., Hamilton, Canada

Filed Sep. 6, 1988, Ser. No. 240,508
Int. Cl.[4] H01R *4/38*
U.S. Cl. 174—88 B **11 Claims**



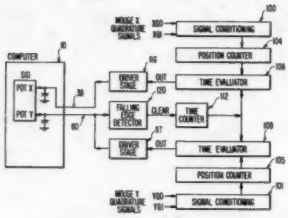
1. A bus duct joint comprising a pair of separate serially connected lengths of bus duct, each of said lengths of bus duct including a plurality of flat elongated relatively closely spaced bus bars disposed in flatwire stacked insulated relationship to each other, a plurality of rectangularly shaped conductive links having central holes, and extending in a parallel relationship with said bus bars to overlap and contact the adjacent ends of the bus bars of similar phases to be joined, the ends of the bus bars having recesses of a semicircular nature to permit acceptance of a bolt and insulating sleeve therein; a plurality of rigid insulators of substantially flat rectangular shape for receiving said conductive links on each side thereof so as to form a conductive link-insulator-conductive link sandwich in the space between adjacent bus bars, a bolt passing through holes in said insulators and insulated from but passing through the holes of said links and through a circular aperture formed by said semicircular recesses in the adjacent ends of said bus bars, a nut engaging the end of said bolt and arranged when tightened to apply compressive force to said links, bus bars and insulators, forcing the links into contact with said bus bars with a substantially uniform pressure on the surfaces of each of the bus bars to be joined.

4,886,941

CIRCUIT FOR INTERFACING MOUSE INPUT DEVICE TO COMPUTER SYSTEM

Hedley Davis, Middletown, Del., and Robert Raible, West Chester, Pa., assignors to Commodore Business Machines, Inc., West Chester, Pa.

Filed May 19, 1987, Ser. No. 51,451
Int. Cl.[4] G08C *21/00*
U.S. Cl. 178—18 8 Claims



1. A mouse-type input device for connection to a computer having a timing means for generating a succession of time cycles and a sensing means for sensing the time of occurrence of a predetermined voltage during each of the time cycles, said input device comprising:

(a) motion sensor means responsive to the travel of said input device operative to generate a succession of electrical signals having characteristics corresponding to the distance and direction of travel of said input device;

(b) interface means responsive to said succession of electrical signals for generating during each of the succession of time cycles a first pulse of predetermined voltage having a time of occurrence in a respective time cycle corresponding to the characteristics of said electrical signals; and

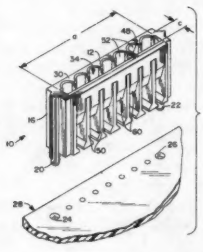
(c) coupling means for receiving said succession of time cycles from the computer and for transmitting corresponding ones of said first pulses in succession.

4,886,942

STRAIN RELIEF STRUCTURE FOR CONNECTING FLAT FLEXIBLE CABLE TO A CIRCUIT BOARD

William Lenz, Crestwood; Arvind Patel, Naperville, and Thaddeus Tomkiewicz, Woodridge, all of Ill., assignors to Molex Incorporated, Del.

Filed Feb. 24, 1989, Ser. No. 315,052
Int. Cl.[4] H02G *15/007;* H01R *13/58;* H05K *1/18*
U.S. Cl. 174—135 18 Claims



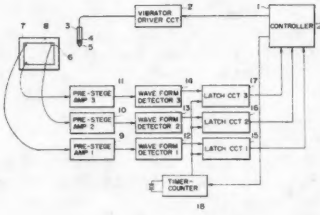
1. A strain relief structure for connecting a flat flexible cable to a circuit board, said flat flexible cable comprising an array of parallel conductors, flexible insulation disposed around said conductors and webs of insulation disposed between the conductors in said array, one end of said cable being prepared by removing portions of the webs of insulation between adjacent conductors for a selected length from the end of said cable, said strain relief structure comprising a body having at least one cable receiving aperture extending therethrough, at least one strain relief means adjacent said aperture for engaging the insulation on the cable, at least one transverse wall extending into said aperture, said transverse wall comprising at least one insertion control means for engaging the web of insulation between the conductors of said cable for defining a first depth of insertion of said cable into said strain relief structure, said cable receiving aperture being configured to enable said cable to be moved out of engagement with said insertion control means for permitting a second depth of insertion of said cable into said strain relief structure, whereby said first depth of insertion enables said strain relief structure to protect the end of the cable and whereby said second depth of insertion enables connection of said cable to the circuit board.

4,886,943

COORDINATES INPUT APPARATUS

Noriyuki Suzuki, Tokyo; Atsushi Tanaka, Kawasaki; Kiyoshi Kaneko, Yokohama; Yuichiro Yoshimura, Tokyo; Shinnosuke Taniishi, Tokyo; Katsuyuki Kobayashi, Tokyo, and Shigeki Mori, Tokyo, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Jan. 23, 1989, Ser. No. 299,440
Claims priority, application Japan, Jan. 28, 1988, 63-015989
Int. Cl.[4] G08C *21/00*
U.S. Cl. 178—18 7 Claims



1. A coordinates input apparatus comprising:

vibration generating means for generating a vibration;

vibration transmitting plate for transmitting the vibration generated by said vibration generating means;

a plurality of vibration detecting means which are arranged on said vibration transmitting plate and detect at a plurality of positions the vibrations transmitted by making the vibration generating means come into contact with the vibration transmitting plate;

calculating means for obtaining vibration transmission distances from vibration transmission times of the vibrations detected by said plurality of vibration detecting means and for calculating a coordinate point on the vibration transmitting plate with which the vibration generating means was come into contact;

output means for outputting the coordinate point calculated by said calculating means;

erroneous detection discriminating means for discriminating whether the coordinate point calculated by said calculating means is an erroneously detected coordinate point or not; and

control means for controlling said output means so as not to output the coordinate point when it is discriminated by said discriminating means that the detected coordinate point is the erroneously detected coordinate point.

4,886,944

PRESSURE OR DRAW BAR OF FIBER-REINFORCED INSULATING MATERIAL

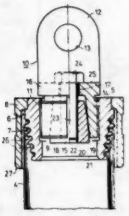
Hans-Gunther Christopher; Joachim Thurk; Dieter Noack, and Thomas Schultz, all of Berlin, Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Fed. Rep. of Germany

Continuation of Ser. No. 128,265, Dec. 3, 1987, abandoned. This application Dec. 6, 1988, Ser. No. 281,905

Claims priority, application Fed. Rep. of Germany, Dec. 4, 1986, 3641632; Mar. 30, 1987, 3710493

Int. Cl.[4] H01H *9/00*

U.S. Cl. 200—48 R 4 Claims



1. A coupling bar in particular for a circuit breaker comprising fiber-reinforced insulating material having a metallic fitting body on a face thereof for transmission of forces, the fiber-reinforced insulating material containing fibers oriented parallel to an axis of the coupling bar, said fibers being secured in form fitting manner in recesses disposed in the fitting body, said recesses extending transversely to the axis of the coupling bar, said fibers being secured in the recesses by tying means for absorbing tensile forces and being impregnated with a curable synthetic material which is thereafter cured, the fitting body having internal threads into which threads a connecting element having external threads is screwed, said connecting element having at least one connecting aperture, the connecting element comprising a fork part in which said connecting aperture is located and further having a slit pipe part having said external threads received in the internal threads of the fitting body, the fork part having a center region closing off the pipe part and providing a wall having a center bore, the pipe part having an internal surface extending conically inclined such that said internal surface expands toward an open face of the pipe part, a spreading body with an oppositely inclined outer surface being arranged in the interior of the pipe part of the connecting element, a screw being provided penetrating through the bore in the wall of the connecting element and holding said spreading body in said pipe part, said screw having an accessible surface in the center region of the fork part for generating a rotational motion thereby allowing said spreading body to force said pipe part external threads against said fitting body internal threads to secure said pipe part in a fixed orientation to said fitting body, said pipe part being secured to said fitting body even when said spreading body loosely engages said internal surface of said pipe part, and when said spreading body does not contact said internal surface of said pipe part, thereby to maintain adjustment of said pipe part with respect to said fitting body even when an axial force is applied to said fitting body, said pipe part being adjustable with respect to said fitting body when said spreading body is loosely disposed in said pipe part and being rigidly fixed to said fitting body when said spreading body tightly engages the internal surface of said pipe part.

4,886,945

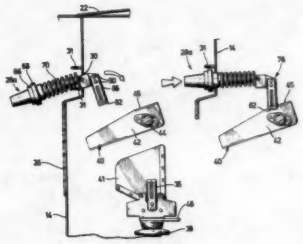
REPLACEABLE BUSHING AND CONTACT ASSEMBLY FOR BLADE TYPE AIR INSULATED SWITCHGEAR

Gerald B. Roberts, Paris, and Edward L. West, Centralia, both of Mo., assignors to A. B. Chance Company, Centralia, Mo.

Filed Oct. 6, 1987, Ser. No. 106,379

Int. Cl.[4] H01H *33/02*

U.S. Cl. 200—144 R 17 Claims



1. In electrical switchgear apparatus including a housing having walls, source and load side bushings extending through said housing walls, and blade-type switch means within said housing and electrically coupled between said source and load side bushings for selectively making or breaking a current path through the switchgear, said switch means having an elongated, pivotal blade with a movable electrical contact adjacent one end thereof and pivotal mounting structure adjacent the other end thereof, and a stationary contact adapted for mating engagement with said movable contact, the improvement which comprises:

means mounting said switchblade in an upright orientation with said movable contact disposed below said pivotal mounting structure for pivotal movement of the switchblade about an elevated, generally horizontal pivot axis; and

means supporting said stationary contact for engagement with said movable contact in a location below said pivot axis,

there being a bushing assembly electrically coupled with said switchblade and physically located at an elevated position proximal to the upper end of the switchblade, said bushing assembly being a self-contained unit having an outboard end adapted to receive a line connector, an elongated, electrically conductive intermediate portion, and an inboard terminal adjacent the end of said portion remote from said outboard end, said terminal including structure for making a frictional fit mechanical and electrical connection with a mating component of the switchblade within said housing by manipulation of the assembly from a point outside said housing.

4,886,946

SLIDE SWITCH WITH AN EXTENDIBLE ACTUATOR

George J. Franks, Jr., 664 Thompson Cir., Inverness, Ill. 60067

Filed Sep. 9, 1988, Ser. No. 242,635

Int. Cl.[4] H01H *15/24*

U.S. Cl. 200—329 21 Claims

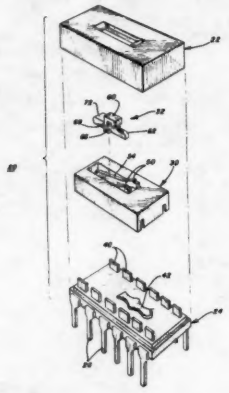
1. A switch, comprising:

a housing containing circuit contact means and an open channel through the housing;

carriage means selectively movable within the housing, the carriage means including means for selectively completing or breaking an electrical path between the circuit contact means; and

an actuator movable with respect to said carriage means between a lowered position in which said actuator is not coupled to said carriage means and being extendable upwardly through the open channel to extend beyond an

outer surface of the housing to a switching position in which the actuator is coupled to the carriage means and the actuator extends sufficiently beyond the outer surface



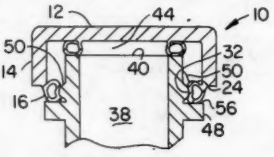
of the housing to allow manual movement of the actuator and said carriage means between at least two switching positions.

4,886,947

CLOSURE SYSTEM AND METHOD OF FORMING AND USING SAME

Mortimer S. Thompson, Maumee, Ohio, assignor to Tri-Tech Systems International, Inc., Maumee, Ohio

Filed Jun. 17, 1987, Ser. No. 63,164
Int. Cl.[4] B65D *41/42*
U.S. Cl. 215—318 **32 Claims**



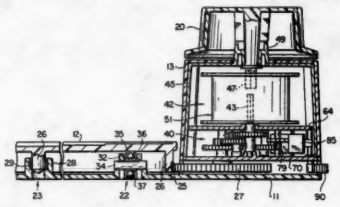
1. A cap and container for containing a product comprising:
a cap including;
(a) a top wall,
(b) a skirt depending from said top wall having a lower curled free end of plastic,
a container for the product including;
(a) an opening for receiving or discharging the product,
(b) a neck surrounding the opening, and
(c) peripheral threads about said neck adapted to engage and form complementary grooves in said curled free end of the cap when cap is placed on the container, to thereby provide a twist cap for opening and closing the container by virtue of the engagement between said peripheral threads on the container and said complementary grooved, curled free end of the cap.

4,886,948

PORTABLE TURNTABLE WITH SHIELDED DRIVE MOTOR FOR MICROWAVE OVENS

James F. Pomroy, St. Paul, Minn., and Albert E. Colato, Valencia, Calif., assignors to Plastics, Inc., St. Paul, Minn.

Division of Ser. No. 131,505, Mar. 18, 1980, Pat. No. 4,330,696, which is a continuation-in-part of Ser. No. 897,048, Apr. 17, 1978, abandoned. This application Dec. 31, 1981, Ser. No. 336,084
Int. Cl.[4] H05B *6/80*; A47B *11/00*
U.S. Cl. 219—10.55 F **10 Claims**



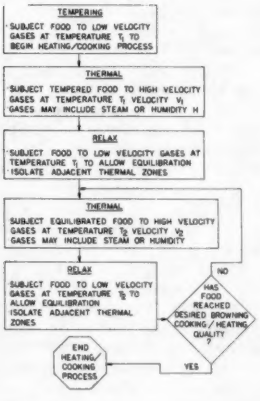
1. In a portable turntable for rotating a food product in the cavity of a microwave oven: a base which rests on the floor of the oven cavity, a platform rotatably mounted on the base, a metal housing forming a microwave-tight enclosure mounted on the base, an aperture formed in one wall of the housing and being of a size sufficiently small to prevent propagation of microwave energy into the housing, a metallic drive spring enclosed within the housing, and an output member rotatably driven by the drive spring and extending through the aperture in driving connection with the platform, said base, said platform and said output member each being fabricated of a material having a low loss tangent at microwave frequencies.

4,886,949

METHOD AND APPARATUS FOR PULSE HEATING AND COOKING FOOD PRODUCTS

Benjamin J. Bellas, Mission Viejo, Calif., and Peter O'Connell, Philadelphia, Pa., assignors to Bellas, Inc., Lancaster, Pa.

Filed Jul. 14, 1987, Ser. No. 72,893
Int. Cl.[4] H05B *6/78*
U.S. Cl. 219—10.55 A **36 Claims**


TEMPERING
SUBJECT FOOD TO LOW VELOCITY GASES AT TEMPERATURE T1 TO BEGIN HEATING/COOKING PROCESS
THERMAL
SUBJECT TEMPERED FOOD TO HIGH VELOCITY GASES AT TEMPERATURE T1 VELOCITY V1 GASES MAY INCLUDE STEAM OR HUMIDITY H
RELAX
SUBJECT FOOD TO LOW VELOCITY GASES AT TEMPERATURE T2 TO ALLOW EQUILIBRATION ISOLATE ADJACENT THERMAL ZONES
THERMAL
SUBJECT EQUILIBRATED FOOD TO HIGH VELOCITY GASES AT TEMPERATURE T2 VELOCITY V2 GASES MAY INCLUDE STEAM OR HUMIDITY
RELAX
SUBJECT FOOD TO LOW VELOCITY GASES AT TEMPERATURE T2 TO ALLOW EQUILIBRATION ISOLATE ADJACENT THERMAL ZONES
HAS FOOD REACHED DESIRED BROWNING COOKING / HEATING QUALITY ?
NO
YES
END HEATING/ COOKING PROCESS

1. A continuous feed oven for heating and cooking food product, said oven comprising:

(a) a conveyor means for continuously moving product through said oven along a substantially longitudinal path;
(b) a plurality of spaced impingement zones located along said longitudinal path, said impingement zones each comprising a plurality f spaced jet tubes for impinging gases as predetermined humidity and elevated temperatures and at predetermined high velocities against the outer surfaces of product being conveyed on said conveyor means; and
(c) a relaxation zone integrally interposed between adjacent impingement zones, said relaxation zone containing means to effectively isolate said adjacent impingement zones from one another and to provide an equilibration space having a temperature therewithin substantially equal to the predetermined elevated temperatures of the preceding impingement zone, and wherein the velocity of movement of said gases is substantially lower than in said adjacent impingement zones, whereby product passes through a series of alternating impingement and relaxation zones such that an effective thermal pulsing heat application is provided to the product, and the predetermined elevated temperatures throughout the oven are constantly maintained substantially above the desired finished temperature of the product.

4,886,950

PACKAGE ASSEMBLY AND METHOD FOR STORING AND MICROWAVE HEATING OF FOOD

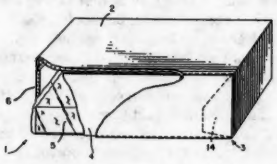
Richard K. Brown, Appleton, and Oscar E. Seiferth, Madison, both of Wis., assignors to James River Norwalk, Inc., Norwalk, Conn.

Division of Ser. No. 907,973, Sep. 16, 1986, Pat. No. 4,742,203, which is a division of Ser. No. 738,490, Jun. 21, 1985, Pat. No. 4,612,431, which is a division of Ser. No. 637,057, Aug. 2, 1984, Pat. No. 4,555,605. This application Nov. 19, 1987, Ser. No. 122,934

The portion of the term of this patent subsequent to Nov. 26, 2002, has been disclaimed.

Int. Cl.[4] H05B *6/64*

U.S. Cl. 219—10.55 E **1 Claim**



1. A food package assembly for use in heating a predetermined quantity of food in a microwave oven having an oven support surface, comprising:
(a) a food supporting means for supporting the predetermined quantity of food within a microwave oven when the predetermined quantity of food is heated by microwave energy, said food supporting means including a food supporting surface; and
(b) packaging means for combining together said food supporting surface and the predetermined quantity of food in a first configuration for shipping and storage and a second configuration for microwave heating in which a partially enclosed air space is formed between the said food supporting surface and the oven support surface to promote even microwave heating of the predetermined quantity of food when said packaging means and the predetermined quantity of food are placed in the microwave oven, said packaging means including heating stand means mechanically manipulatable to convert said packaging means from its first configuration in which no air space is formed ajacent said food supporting surface to its second configuration in which said air space is formed with said food supporting surface being positioned a predetermined distance above the oven support surface for promoting even microwave heating of the predetermined quantity of food.

4,886,951

POWER SUPPLY FOR A MAGNETRON HAVING A RECTIFYING CIRCUIT, SWITCHING CIRCUIT, AND TRANSFORMER

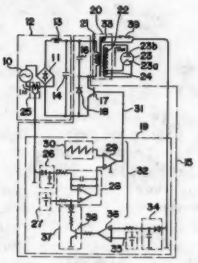
Takahiro Matsumoto, Nara; Haruo Suenaga, Kyoto; Naoyoshi Maehara, Nara; Kazuho Sakamoto, Kyoto; Takashi Niwa, Nara; Daisuke Bessyo, Yamatokoriyama; Shigeru Kusunoki, Yamatokoriyama, and Takao Shitaya, Yamatokoriyama, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed May 2, 1988, Ser. No. 189,170

Claims priority, application Japan, Apr. 30, 1987, 62-106636; Apr. 30, 1987, 62-106637

Int. Cl.[4] H05B *6/68*

U.S. Cl. 219—10.55 B **14 Claims**



1. A magnetron power supply comprising: a magnetron having a cathode heater;
a rectifying means for converting an ac-power source signal into a dc-power source signal;
a switching means coupled to a driving circuit and said rectifying means for converting said dc-power source signal into a low-voltage high-frequency signal in accordance with said driving circuit; and,
a transformer having a core, said transformer coupled to said switching means and said driving circuit, for converting said low-voltage high-frequency signal into a high-voltage high-frequency signal for driving said magnetron;
said transformer including a primary winding connected to said switching means, a secondary winding connected to and supplying power to said magnetron, a tertiary winding connected to said cathode heater of said magnetron for providing heating power to said cathode heater, and a fourth winding connected to and supplying signals to said driving circuit;
wherein a coupling coefficient between said fourth winding and said secondary winding is larger than a coupling coefficient between said fourth winding and said primary winding.

4,886,952

POWER SOURCE DEVICE FOR HIGH-FREQUENCY INDUCTION HEATING

Yasushi Horiuchi, No. 11-10, Kamiyouga 3-chome, Setagaya-ku, Tokyo, Japan

Filed Jun. 7, 1988, Ser. No. 203,089

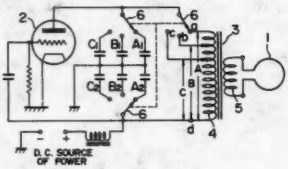
Claims priority, application Japan, Jun. 10, 1987, 62-144499

Int. Cl.[4] H05B *6/06*

U.S. Cl. 219—10.77 **2 Claims**

1. A high-frequency induction heating apparatus for induction heating a steel production for surface quenching, said apparatus comprising a heating coil for applying high-fre-

quency power to the surface of said steel product and a self-excited high-frequency power source for supplying high-frequency power to said heating coil, said self-excited high-frequency power source comprising a D.C. source of power, an oscillating element adapted to be energized by said D.C. source of power, a matching transformer having a primary winding and a secondary winding, a plurality of capacitors and high-speed switching means, said heating coil being connected to said secondary winding, said primary winding having a plurality of taps each provided at a position of said primary winding including a different number of turns so as to permit the tapped portions of said primary winding to impedance-match with said secondary winding of said matching transformer and said heating coil connected to said secondary winding at a plurality of frequencies suitable for performing induction heating of said steel product in time-division fashion according to a size, shape and state of said steel product, each of said capacitors being adapted to be combined with a predetermined one of said taps to form a tank circuit for said oscillating element, the natural frequency of which tank circuit is the frequency corresponding to said predetermined tap of said plurality of frequencies, said high-speed switching means being adapted to switch connections of said tank circuits to said oscillating element to perform induction-heating in time-division fashion using high-frequency power at said plurality of frequencies.



4,886,953

ELECTRODE WIRE FOR A ROLLER SEAM WELDING MACHINE

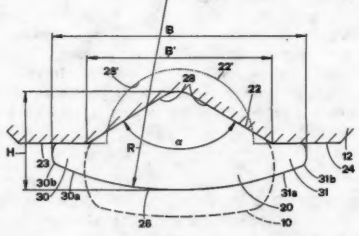
Werner Urech, Kaiserstuhl, Switzerland, assignor to Elpatronic AG, Zug, Switzerland

Filed May 23, 1988, Ser. No. 197,453

Claims priority, application Switzerland, Jun. 22, 1987, 02346/87

Int. Cl.[4] B23K *1/16*

U.S. Cl. 219—64 **9 Claims**



1. In a roller seam welding machine having at least one electrode wire and one roller electrode with a guide groove (22) provided in its circumference to receive the electrode wire (20), the electrode wire having a front (26) which faces the work being welded (16') and which is of selected shape, for example substantially flat, rounded or V-shaped, the wire also having a back (28,28') which is received in the guide groove (22,22') of the roller electrode (12) and which is also selectively shaped, preferably V-shaped or round in cross-section, the improvement characterized in that the electrode wire has two flanges (30, 31) formed thereon in the longitudinal direction of the wire and located in the transition region between the front and the back (26,28,28') to support the electrode wire (20) on the circumference of the roller electrode (12) at both sides of the guide groove (22,22').

4,886,954

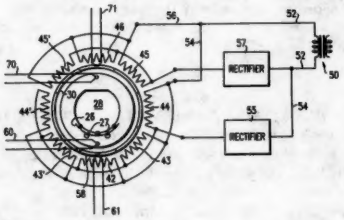
HOT WALL DIFFUSION FURNACE AND METHOD FOR OPERATING THE FURNACE

Chorng-Tao Yu, Placentia; Michael A. Fisk, Anaheim, and Alan Emami, Huntington Beach, all of Calif., assignors to Thermco Systems, Inc., Orange, Calif.

Filed Apr. 15, 1988, Ser. No. 181,787

Int. Cl.[4] H05B *3/62*

U.S. Cl. 219—390 **10 Claims**



1. A hot wall diffusion furnace for processing semiconductor wafers in a flat temperature zone of a processing chamber comprising a plurality of separate heating elements being coextensive with a length of said flat temperature zone and being spaced peripherally around said processing chamber, a first group and a second group of said heating elements, said first group being adjacent each other and being positioned above the elements of said second group, first power control means and second power control means connected to said first group and said second group of heating elements, respectively, first temperature sensing means responsive to temperature at a top portion of said processing chamber and second temperature sensing means temperature to temperature at a bottom portion of said processing chamber, said first and second temperature sensing means being connected, respectively, to said first and second power control means to control power to said first and second group of heating elements to equalize temperature between the top and bottom of said processing chamber wherein the resistance of the heating elements of said first group is greater than the resistance of said heating elements in said second group to equalize temperature across a vertical height of said chamber.

4,886,955

HEATING APPARATUS FOR MAINTAINING A SOLUTION AT A PREDETERMINED TEMPERATURE

Shinichi Kimura, Yamatokoriyama, Japan, assignor to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Mar. 14, 1988, Ser. No. 167,730

Claims priority, application Japan, Jun. 9, 1987, 62-89124[U]; Jun. 10, 1987, 62-89740[U]

Int. Cl.[4] H05B *1/02*

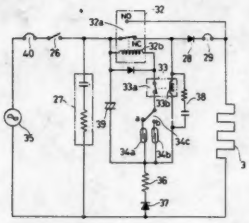
U.S. Cl. 219—494 **3 Claims**

1. A heating apparatus for applying heat to a container, comprising:

heating means for detecting the presence of the container and applying heat to the container when the container is detected to be present;

temperature detecting means for detecting a temperature of the container;

energizing control means, electrically connected to said temperature detecting means for permitting heat to be applied by said heating means until said temperature is detected to exceed a predetermined value, said energizing control means comprising a first relay and a series circuit connected in series to said heating means, said first relay supplying AC directly to said heating means when the container is detected to be present and said series circuit supplying DC to said heating means after said temperature is detected to be below said predetermined value; and



switch means for disconnecting said energizing control means from said heating means in response to said temperature exceeding said predetermined value and controlling said heating means for maintaining said temperature of the container within a predetermined temperature range below said predetermined value, said switch means comprising a second relay for disconnecting said series circuit from said heating means by said first relay.

4,886,956

METHOD OF ELECTRODING PTC HEATERS

Lionel J. Melanson, Casco, Me., and Thomas J. Sentementes, Wakefield, Mass., assignors to GTE Products Corporation, Stamford, Conn.

Filed Oct. 26, 1988, Ser. No. 262,636
Int. Cl.[4] H05B *3/08, 3/44*
U.S. Cl. 219—541 **2 Claims**

1. The method of electroding a PTC heater having surfaces to be electroded and also having passages for heating a fluid flowing therethrough comprising the steps of: hot aluminum spraying the PTC heater to adheredly coat said surfaces with aluminum; coating said aluminum-coated surfaces with a solvent-removable alkali-resistant resist ink; immersing the PTC heater in hot alkaline solution to dissolve and remove all aluminum that is not coated with resist ink; rinsing and drying the PTC heater; and solvent removing the resist ink from the PTC heater.

4,886,957

CARD READER FOR RECEIVING A CARD BEARING AN IMPRINTED DATA STRIP, SELF POSITIONING THE CARD IN A PRE-DETERMINED POSITION AND SCANNING THE IMPRINTED DATA STRIP IN TWO DIRECTIONS

John Glaberson, Newtown, and Scott Santulli, Danbury, both of Conn., assignors to Cauzin Systems, Incorporated, Waterbury, Conn.

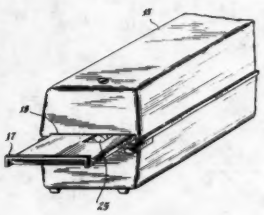
Filed May 15, 1986, Ser. No. 863,587
Int. Cl.[4] G06K *7/015, 7/10*
U.S. Cl. 235—482 **16 Claims**

1. A card reader for bi-directional scanning of the data strip on a card while said card is held in a fixed position,

said reader including a housing to receive said card and a bi-directional optical scanner mounted within said housing in a position to scan said card while said card is held stationary in a predetermined position within said housing, said reader including

alignment means for positioning said card in said predetermined position within said reader,

said alignment means including a pair of perpendicular alignment guides for receiving adjacent edges of said card and a window for positioning a planar surface of said card, a card driver to move said card to scanning position against said guides and said window and hold said card stationary during scanning, an input detector and an alignment detector, said input detector being located proximate to an



input slot in said housing and including circuitry to cause said card driver, upon detection of the presence of a said card, to draw said card into said reader and to position it for scanning, and said alignment detector being adapted to sense when said card is in said predetermined position for scanning and to actuate said optical scanner,

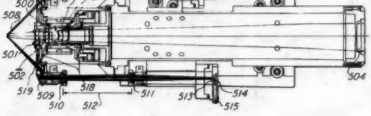
whereby said card may be inserted into said card reader and thereafter automatically be positioned in three dimensions for scanning and scanned.

4,886,958

AUTOFOCUS SYSTEM FOR SCANNING LASER INSPECTOR OR WRITER

Jerry D. Merryman, Dallas, and Vernon R. Porter, Plano, both of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Filed Mar. 25, 1988, Ser. No. 173,707
Int. Cl.[4] G01J *1/20;* G01C *3/08*
U.S. Cl. 250—201 **5 Claims**



1. An autofocus system for a pattern inspection or writing system, comprising;

an objective lens assembly including a fixed long focus lens and a movable objective lens for focusing a first laser beam on the surface of a target for pattern inspection or writing;

an autofocus laser fixed to the objective lens assembly, for directing a second laser beam to strike the surface of the target at an oblique angle;

a photodetector for detecting the relative movement of the reflected second laser beam, as the distance of the objective lens assembly to the surface of the target varies, and for generating an electrical signal in response to the relative movement; and

a servo-system responsive to the electrical signal, for moving said movable objective lens axially to keep the first

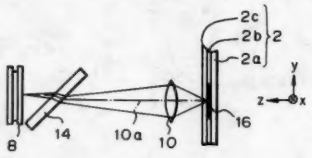
laser beam focused on the surface of the target as the distance of the objective lens assembly to the surface of the target varies.

4,886,959

OPTICAL INFORMATION REPRODUCING APPARATUS

Hiroaki Hoshi, Isehara, and Kozomu Kitagishi, Hachioji, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Nov. 24, 1987, Ser. No. 125,003
Claims priority, application Japan, Nov. 27, 1986, 61-280836; Jun. 19, 1987, 62-151406
Int. Cl.[4] G01J *1/20*
U.S. Cl. 250—201 11 Claims



1. An optical information reproducing apparatus for reproducing information of an optical information record medium having a transparent layer on an information recording plane, comprising:

hold means for holding said optical information record medium;

a focusing optical system having an optical axis inclined with respect to a normal line to the information recording plane of said optical information record medium held by said hold means;

a photo-detector arranged at a position to which the information recording plane is focused by said focusing optical system;

said photo-detector detecting an image of the information recording plane to reproduce the information of said optical information record medium; and

an optical element arranged in said focusing optical system;

said optical element compensating for an astigmatism created by the transparent layer of said optical information record medium.

4,886,960

CONTROL CIRCUIT FOR AN AUTOMATIC REARVIEW MIRROR

Keith W. Molyneux, Ballymore Eustace, and Thomas D. Gaffney, Bray, both of Ireland, assignors to Donnelly Mirrors Limited, Naas, Ireland

Filed Apr. 5, 1988, Ser. No. 177,614
Claims priority, application Ireland, Apr. 8, 1987, 918/87
Int. Cl.[4] H01J *40/14*
U.S. Cl. 250—209 16 Claims

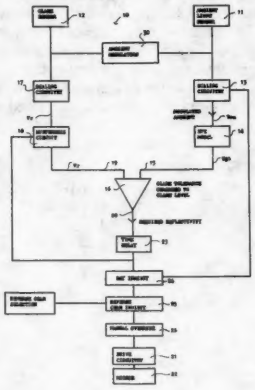
1. An automatic rearview mirror system for a vehicle comprising:

a reflective element actuatable between at least two different reflective conditions;

a forward light sensor means for sensing light in a direction other than rearward of the mirror;

a rear light sensor means for sensing light rearward of the mirror; and

control circuit means for causing the reflective element to assume a reflective condition as a function of at least the output of said forward and rear light sensor means, said control circuit including modulation means for modifying the output of said forward light sensor means to produce a modified forward light signal and comparison means responsive to the output of said rear light sensor means and said modified forward light signal for indicating the desired reflectance condition of said reflective element as a function of said output of said rear light sensor and said modified forward light signal, wherein said modulation means modifies the output of said forward light sensor



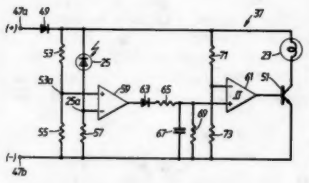
means in a manner that reduces the sensitivity of said control means to light rearward of the mirror.

4,886,961

LIGHT DETECTOR HAVING LIGHT SENSOR AND LIGHT INDICATOR, AND CONTROL CIRCUIT THEREOF

Mitsutoshi Kimura, and Masaharu Baba, both of Yokohama, Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Jun. 16, 1988, Ser. No. 207,658
Claims priority, application Japan, Jun. 17, 1987, 62-150479; Jan. 5, 1988, 63-207[U]
Int. Cl.[4] G01J *1/32*
U.S. Cl. 250—205 17 Claims



1. A light detector comprising:

light indicator means for radiating light, the light indicator means initiating radiation of light therefrom when ambient light is below a prescribed level;

light sensor means for receiving actual light including ambient light and the light from the light indicator means for outputting a detection signal corresponding to a level of the actual light,

the light indicator responding to the light sensor; and

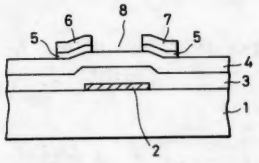
control circuit means for evading effect of the light from the light indicator means for controlling the light indicator means while ambient light is below the prescribed level even though the actual light received by the light sensor increases above the prescribed level by the radiation of light from the light indicator means.

4,886,962

METHOD FOR DRIVING A PHOTO-SENSOR BY APPLYING A PULSE VOLTAGE TO AN AUXILIARY ELECTRODE DURING A NON-READ TIME

Ihachiro Gofuku, Hiratsuka; Yoshiyuki Osada, Atsugi, and Katsumi Nakagawa, Kawasaki, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 63,062, Jun. 17, 1987, abandoned. This application Sep. 12, 1988, Ser. No. 244,562
Claims priority, application Japan, Jun. 20, 1986, 61-142986
Int. Cl.[4] H01J *40/14*
U.S. Cl. 250—211 J 2 Claims



1. A method for driving a photo-sensor having a pair of main electrodes formed on a semiconductor layer with a photo-sensing area being arranged therebetween, and the semiconductor layer and an auxiliary electrode formed on at least the photo-sensing area with an insulative layer being interleaved, the auxiliary electrode being used for stabilizing the photo-sensor output, comprising the steps of:

applying a bias voltage to the auxiliary electrode in accordance with carries carrying a current of the semiconductor layer; and

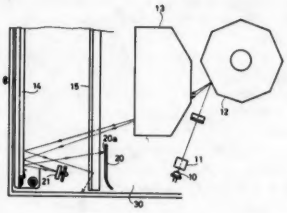
applying a voltage of the same polarity as that of the bias voltage and smaller in absolute value than the bias voltage to the auxiliary electrode for a predetermined time in a non-read period of the photosensor to cause a next photo-sensor output to be read while a previous photo-sensor output has been erased.

4,886,963

LASER BEAM SCANNING APPARATUS WITH COMPACT SOS SENSOR

Naoto Ohmori, Osaka, Japan, assignor to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed May 25, 1988, Ser. No. 198,751
Claims priority, application Japan, May 27, 1987, 62-130969; May 27, 1987, 62-130970
Int. Cl.[4] H01J *3/14*; G02B *26/08*
U.S. Cl. 250—235 11 Claims



1. A laser beam scanning apparatus for beam scanning a recording medium with the laser beam being deflected by a deflector, comprising:

a first mirror provided for reflecting a light path between said deflector and said recording medium;

a beam detecting senor for determining a start position for recording by the beam on said recording medium; and

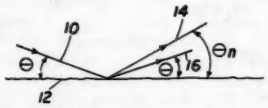
a second mirror for guiding the beam reflected by said first mirror to said sensor, wherein said second mirror is arranged such that the beam from the first mirror is guided to said sensor after it it further reflected at least one time by said first mirror.

4,886,964

MATTER WAVE OPTICAL SYSTEMS IN WHICH AN ATOMIC BEAM INTERSECTS A DIFFRACTION GRATING AT A GRAZING INCIDENCE

David E. Pritchard, Cambridge, Mass., and David W. Keith, Ottawa, Ontario, Canada, assignors to Massachusetts Institute of Technology, Cambridge, Mass.

Filed Sep. 16, 1988, Ser. No. 245,687
Int. Cl.[4] H01J *39/34*
U.S. Cl. 250—251 12 Claims



1. Matter wave optical system comprising:

a matter diffraction grating; and

an atomic beam intersecting the grating at a grazing incidence.

4,886,965

METHOD FOR CALIBRATING VARIABLE WAVELENGTH LIQUID CHROMATOGRAPHY DETECTORS

J. Benjamin Esquivel H., Midland, Mich., assignor to The Dow Chemical Company, Midland, Mich.

Filed Aug. 8, 1988, Ser. No. 229,574
Int. Cl.[4] G01D *18/00*; G01N *31/00*; G01J *1/02, 3/00*
U.S. Cl. 250—252.1 A 7 Claims

1. A method for determining the wavelength accuracy of a variable wavelength liquid chromatography spectrophotometric detector in the low UV range, the detector having a flow through detection cell and a means to vary the indicated wavelength of detection, which method comprises the steps of:

(a) flowing a solution of terbium III ions in a nondetrimental solvent into the cell, the solution having a detectable concentration of terbium III ions:

(b) varying the indicated wavelength of detection to find the indicated wavelength of maximum absorbance of the solution in a wavelength region around a predetermined reference wavelength for terbium III in the solvent: and

(c) calculating the difference, in units of nm, between the indicated wavelength of maximum absorbance of step (b) and the reference wavelength of step (b) to determine the accuracy of the detector at the reference wavelength of step (b).

4,886,966

APPARATUS FOR INTRODUCING SAMPLES INTO AN INDUCTIVELY COUPLED, PLASMA SOURCE MASS SPECTROMETER

Hideki Matsunaga, Yokohama, and Naoyuki Hirate, Yokosuka, both of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

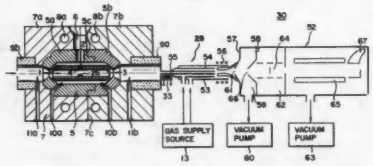
Filed Jan. 5, 1989, Ser. No. 293,667
Claims priority, application Japan, Jan. 7, 1988, 63-1657; Mar. 18, 1988, 63-63466; Jun. 24, 1988, 63-156463
Int. Cl.[4] H01J *49/00*
U.S. Cl. 250—288 51 Claims

1. An apparatus for vaporizing a sample and introducing the

vaporized sample into an inductively coupled plasma source mass spectrometer, comprising:

means for supplying an inert gas which transfers the vaporized sample;

a heater for generating a heat with an electrical power, which is provided with a film structure having an inner



surface for defining a path through which the inert gas is passed and on which the sample is to be located, the film structure including a material for forming the inner surface, and essentially consisting of one selected from the group consisting of a metal oxide and a nitride; and

an electrode structure for supporting the heater and supplying the electrical power to the heater.

4,886,967

LIGHT BEAM SCANNING APPARATUS

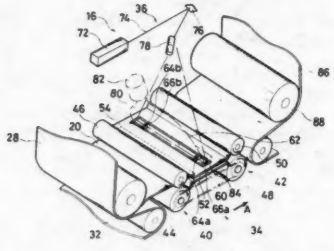
Toru Itakura, Kanagawa, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Aug. 28, 1987, Ser. No. 90,626

Claims priority, application Japan, Aug. 28, 1986, 61-202381

Int. Cl.[4] H04N *1/12*

U.S. Cl. 250—327.2 **5 Claims**



1. A light beam scanning apparatus comprising:

means for continuously exposing a sheet-like subject to be scanned having subsequently perpendicular longitudinal and transverse dimensions to a deflected scanning light beam in a transverse direction to perform main scanning along a main scanning line; means for transferring said subject in a longitudinal direction along a transfer path to perform sub-scanning so as to accomplish two-dimensional scanning of said subject;

at least two apertures associated with said transferring means, said apertures being in alignment with said main scanning line and disposed in said transfer path so as to be covered by said sheet-like subject during movement thereof;

an element associated with each of said apertures for receiving light from said scanning light beam transmitted by said apertures and for producing block signals each indicating blockage of one of said apertures; and

means for detecting a time lag of block signals produced by said light-receiving element associated with each of said two apertures, and for determining if said time lag is greater than a predetermined time lag resulting from movement of said scanning light beam during main scanning, thereby detecting inclination of said subject,

said transfer means includes:

two pairs of rollers for carrying said subject in its longitudinal direction while clamping it between each pair of rollers, said pairs of rollers being spaced a distance shorter than the longitudinal direction of said subject,

means for synchronously rotating said two pairs of rollers to perform sub-scanning, while the subject being exposed to a deflected light beam between said pair of rollers to perform main scanning, and

a member located between said pairs of rollers for supporting said subject, said apertures being perforated in said support member.

4,886,968

RADIATION IMAGE READ-OUT APPARATUS

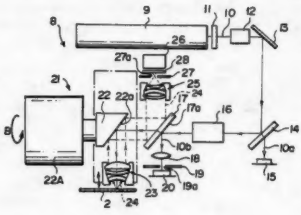
Masahiro Ohnishi; Nobuhiko Ogura, and Katsuaki Muraishi, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Jul. 28, 1988, Ser. No. 225,443

Claims priority, application Japan, Jul. 29, 1987, 62-189539; Feb. 3, 1988, 63-23500; Feb. 12, 1988, 63-30629; Feb. 19, 1988, 63-37003; Feb. 19, 1988, 63-37004

Int. Cl.[4] G03G *5/16*

U.S. Cl. 250—327.2 **9 Claims**



1. A radiation image read-out apparatus for reading out a radiation image stored on a stimulable phosphor sheet by scanning the stimulable phosphor sheet carrying the radiation image stored thereon with stimulating rays which cause the stimulable phosphor sheet to emit light in proportion to the stored radiation energy, and photoelectrically detecting the emitted light,

wherein the improvement comprises the provision of:

(i) a sheet holding means for holding said stimulable phosphor sheet thereon in a cylindrical surface form,

(ii) a stimulating ray source for producing said stimulating rays,

(iii) a semi-transparent mirror provided in an optical path of said stimulating rays for transmitting and/or reflecting the incident stimulating rays,

(iv) a spinner provided with a deflection mirror for reflecting said stimulating rays coming from said semi-transparent mirror toward said stimulable phosphor sheet on the center axis of said cylindrical surface, and a condensing lens provided in the optical path of said stimulating rays reflected by said deflection mirror for converging said stimulating rays on said stimulable phosphor sheet, said spinner rotating said deflection mirror and said condensing lens together coaxially with respect to said center axis, thereby to scan said stimulating rays in a main scanning direction on said stimulable phosphor sheet,

(v) a sub-scanning means for moving said sheet holding means with respect to said spinner in parallel with said center axis,

(vi) a detection lens provided in an optical path of said light emitted by said stimulable phosphor sheet, passing

through said condensing lens and coming from said semi-transparent mirror, said detection lens converging said emitted light,

(vii) an aperture plate provided at a position of convergence of said emitted light by said detection lens and having an aperture of a size allowing the passage of only said emitted light thus converged therethrough, and

(viii) a photodetector provided at the rear of said aperture plate.

4,886,969

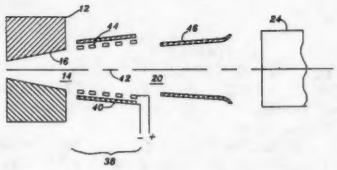
CLUSTER BEAM APPARATUS UTILIZING COLD CATHODE CLUSTER IONIZER

Wolfgang Knauer, Malibu, Calif., assignor to Hughes Aircraft Company, Los Angeles, Calif.

Filed Dec. 16, 1988, Ser. No. 285,830

Int. Cl.[4] H01J *31/08*

U.S. Cl. 250—427 **20 Claims**



1. Apparatus for producing an ionized cluster beam, comprising:

means for generating a beam of clustered and unclustered atoms; and

means for ionizing the clusters of atoms in the beam, the means for ionizing comprising

cathode means for emitting secondary electrons when impacted by ions,

anode means for accelerating the secondary electrons emitted by the cathode means into the beam, the means for ionizing being located sufficiently close to the beam and to the means for generating that a stable plasma may be formed in the beam by the application of a voltage between the anode means and the cathode means, the plasma serving as the source for the ions that impact the cathode means to produce the secondary electrons that ionize the clustered and unclustered atoms.

4,886,970

X-RAY DIAGNOSTIC DEVICE WITH AN X-RAY CONVERTER

Jörg Haendle, Erlangen, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Sep. 6, 1984, Ser. No. 647,962

Claims priority, application Fed. Rep. of Germany, Sep. 9, 1983, 33326487

Int. Cl.[4] H01J *31/50*

U.S. Cl. 250—484.1 **1 Claim**

1. An X-ray diagnostic device of a type in which a luminescent fluoroscopic screen stores a latent X-ray image, the screen is scanned with radiation from a radiation source that is directed by a deflecting device to produce an optical image, and the optical image is passed through an optical system and made incident upon a detector for display on a video monitor, comprising:

a flat image intensifier with near filed focussing which is electro-optically coupled to the luminescent fluoroscopic screen to form an image intensifier unit, said unit comprising

an inut screen assembly comprising a first carrier layer, an input fluoroscopic screen and a photocathode, the input fluoroscopic screen being of X-ray luminescent material and being secured on one surface to the carrier layer, and the photocathode being vapor-deposited on another surface of the input fluoroscopic screen; and

an output screen assembly comprising a second carrier layer

which is permeable to infrared and visible radiation, an output fluoroscopic screen and a thin conducting film, the output fluoroscopic screen being of thermo-luminescent material and being secured on one surface to the second carrier layer, and the thin conducting film being secured to another surface of the output fluoroscopic screen to face the input screen assembly.

4,886,971

ION BEAM IRRADIATING APPARATUS INCLUDING ION NEUTRALIZER

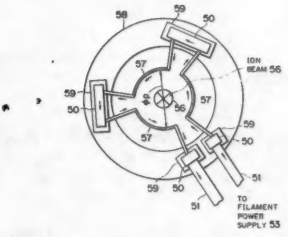
Yasushi Matsumura; Akira Shuhara; Shigeo Sasaki; Kazumi Fukumoto, and Hitoshi Takeya, all of Hyogo, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 9, 1988, Ser. No. 165,957

Claims priority, application Japan, Mar. 13, 1987, 62-59522; Mar. 13, 1987, 62-59523; Mar. 17, 1987, 62-62896; Mar. 17, 1987, 62-62900; Mar. 17, 1987, 62-39686[U]

Int. Cl.[4] H01J *37/00*; G21K *5/00*

U.S. Cl. 250—492.2 **17 Claims**



1. An ion beam irradiating apparatus comprising:

generating means for generating ion beams;

accelerating means for accelerating the ion beams emitted from the generating means;

selecting means for selecting a specified ion beam derived from the accelerated ion beams;

means for holding a sample receiving the specified ion beam derived from the selecting means; and,

ion neutralizer means positioned between the selecting means and the sample holding means, said ion neutralizer means including:

filament means for emitting a thermoelectron beam to neutralize the specified ion beam, said filament means being subdivided into a plurality of W-shaped filament elements having substantially the same length and same diameter and being connected to each other in series and surrounding the specified ion beam.

4,886,972

FAR INFRARED RAY EMITTING BODY OF A CORE MATERIAL COATED WITH AN ULTRAFINE POWDER

Hirotaka Nakai, Kyoto, and Setsuji Edagawa, Nishinomiya, both of Japan, assignors to O.K. Trading Co., Ltd., Osaka, Japan

Filed Jan. 12, 1989, Ser. No. 296,026
Claims priority, application Japan, Aug. 3, 1988, 63-192781
Int. Cl.[4] C09K 9/00
U.S. Cl. 250—504 R 3 Claims

1. A far infrared ray emitting body, comprising:

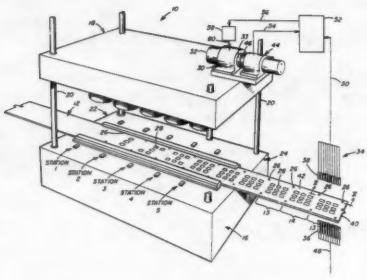
a core material having adhered thereto an ultrafine powder of a particle size below 500 Å of one or more compounds selected from the group consisting of alumina hydrate, silica hydrate, and mixtures thereof which is chemically produced in an aqueous dispersion of said core material.

4,886,973

SHEET STRIP MATERIAL MISFEED DETECTOR

Harry Walters, Pittsburgh, Pa., assignor to Oberg Industries, Inc., Freeport, Pa.

Continuation of Ser. No. 84,453, Aug. 12, 1987, Pat. No. 4,855,606. This application Mar. 20, 1989, Ser. No. 326,484
Int. Cl.[4] G01N 21/86; G01V 9/04
U.S. Cl. 250—548 12 Claims



1. Apparatus for detecting a sheet strip material misfeed condition in a stamping press having an intermittent feed comprising,

stamping means having an intermittent feed of sheet strip material, said stamping means having an inlet portion and an outlet portion, said stamping means arranged to stamp a sheet strip material passing from said inlet portion to provide a plurality of individual openings in said sheet strip material,

encoder means to identify the progress of said sheet strip material as it passes through said apparatus,

monitoring means adjacent said stamping means outlet portion,

means for passing said plurality of individual openings in said sheet strip through said monitoring means,

said monitoring means producing a pattern of signals form a plurality of monitoring means signals as each said opening in said sheet strip is passed through said monitoring means,

said monitoring means including a plurality of individual light sources and a plurality of light detectors positioned to provide that each said opening in said strip material exiting said stamping means outlet portion passes between said plurality of light sources and said plurality of light detectors to provide a plurality of signals to said controller means for each said opening in said strip material,

controller means having an input for receiving said plurality of monitoring means signals produced as each said opening in said sheet strip is passed through said monitoring means and an output connected to said stamping means, and

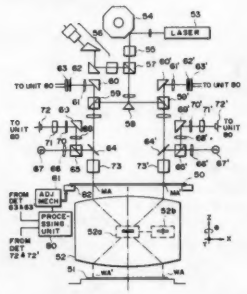
said controller means including means for comparing said pattern of signals from a plurality of monitoring means signals produced as one said opening in said sheet strip is passed through said monitoring means to another pattern of signals from a plurality of monitoring means signals produced as a following opening in said sheet strip is passed through said monitoring means.

4,886,974

MARK DETECTING DEVICE FOR DETECTING THE CENTER OF A MARK BY DETECTING ITS EDGES

Hideki Ina, Kawasaki, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 921,102, Oct. 21, 1986, abandoned. This application Apr. 11, 1989, Ser. No. 336,551
Claims priority, application Japan, Oct. 25, 1985, 60-237542
Int. Cl.[4] G01N 21/86
U.S. Cl. 250—561 11 Claims



1. A device for detecting a mark having edges and being provided on an object, said device comprising:

edge detecting means for detecting the edges of the mark and for producing edge signals corresponding respectively to the edges of the mark;

mark detecting means, responsive to said edge detecting means, for detecting a position of the mark on the basis of the edge signals produced by said edge detecting means;

peak detecting means for detecting the peaks of each of the edge signals produced by said edge detecting means; and

control means for controlling the position detection by said mark detecting means, in accordance with the peaks of the edge signals detected by said peak detecting means,

wherein said mark detecting means includes adding means for combining the edge signals produced by said edge detecting means and for generating a resultant signal therefrom, and signal processing means for processing the resultant signal generated by said adding means to detect the position of the mark, and wherein said control means controls signal processing by said signal processing means in accordance with the detected peaks of the edge signals.

4,886,975

SURFACE EXAMINING APPARATUS FOR DETECTING THE PRESENCE OF FOREIGN PARTICLES ON TWO OR MORE SURFACES

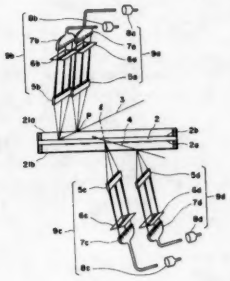
Eiichi Murakami, Yokohama; Michio Kohno, and Akiyoshi Suzuki, both of Tokyo, Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 14,034, Feb. 12, 1987, abandoned. This application May 2, 1989, Ser. No. 348,177

Claims priority, application Japan, Feb. 14, 1986, 61-030362; Mar. 20, 1986, 61-060871; May 23, 1986, 61-118862; May 23, 1986, 61-118863

Int. Cl.[4] G01N *21/88, 21/89*

U.S. Cl. 250—572 3 Claims



1. A surface examining apparatus for examining a first surface and a second surface of an article, said apparatus comprising:

scanning means for scanning said first surface with a first light and, simultaneously therewith, for scanning said second surface with a second light;

first light-receiving means for receiving the light scattered from a first portion of said first surface being scanned with the first light, thereby to examine said first portion of said first surface; and

second light-receiving means for receiving the light scattered from a second portion of said second surface being scanned with the second light, thereby to examine said second portion of said second surface,

wherein said second light-receiving means includes an optical element having an optical axis and wherein the first light passing through said first surface toward said second surface does not intersect said optical axis of said optical element, in a range between said first and second surfaces.

4,886,976

DRIVER CIRCUITRY FOR MULTIPLE SENSORS

Robert J. Tolmie, Jr., Brookfield, Conn., assignor to Pitney Bowes Inc., Stamford, Conn.

Filed Dec. 28, 1988, Ser. No. 291,473

Int. Cl.[4] H01J *40/14*

U.S. Cl. 250—578 8 Claims

1. Driver circuitry for multiple sensors comprising:

a plurality of sensors each comprising radiation generating and radiation detecting means and source leads for applying source current to the radiation generating and detecting means and sink leads for the source current,

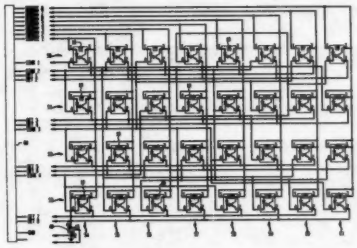
said sensors being arranged in a matrix of rows and columns,

a plurality of source busses,

a plurality of sink busses,

a plurality of detector busses,

means connecting each of the source busses to the radiation generating source leads of one of the columns of sensors,



means connecting the detector sink leads of alternate sensors in a row in common to one of the detector busses.

4,886,977

PHOTOELECTRIC CONVERTER PROVIDED WITH VOLTAGE DIVIDING MEANS

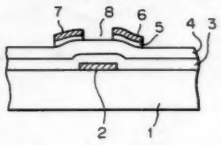
Ihachiro Gofuku, Hiratsuka; Yoshiyuki Osada, Atsugi; Katsumi Nakagawa, Nagahama; Katsunori Hatanaka, Yokohama; Toshihiro Saika, and Noriyuki Kaifu, both of Hiratsuka, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Nov. 9, 1987, Ser. No. 117,957

Claims priority, application Japan, Nov. 11, 1986, 61-266666; Dec. 25, 1986, 61-311204; Dec. 25, 1986, 61-311205

Int. Cl.[4] H01J *40/14*

U.S. Cl. 250—578 33 Claims



1. A photoelectric converter comprising:

a photoelectric conversion unit comprising a pair of main electrodes, spaced by a photoreception area over a semiconductor layer, and an auxiliary electrode laminated with said semiconductor layer through the intermediary of an insulating layer in at least said photoreception area:

a storage capacitor for storing electric charges flowing through said photoelectric conversion unit;

a transfer transistor for transferring the charges stored in said storage capacitor;

a discharge transistor comprising a control electrode for discharging the charges stored in said storage capacitor; and

dividing means for dividing a switching voltage applied to said control electrode of said discharge transistor and for applying a divided voltage to said auxiliary electrode.

4,886,978

EXHAUST ENERGY RECOVERY APPARATUS FOR ENGINE

Hideo Kawamura, Samukawa, Japan, assignor to Isuzu Motors Limited, Tokyo, Japan

Filed May 31, 1988, Ser. No. 200,583

Claims priority, application Japan, May 30, 1987, 62-133454

Int. Cl.[4] F02G *5/00*

U.S. Cl. 290—52 9 Claims

1. An exhaust energy recovery apparatus for an engine of a motor vehicle, comprising:

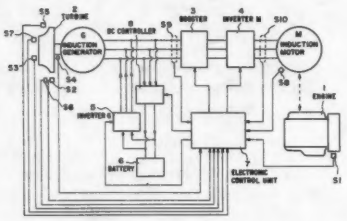
a turbine connected to the engine drivable by exhaust gases emitted from the engine;

sensors connected to said turbine, detecting operating conditions of said turbine and providing corresponding detection signals;

an induction generator connected to said turbine and drivable by said turbine, providing generated electric power;

an induction motor connected to said induction generator and drivable by the electric power generated by said induction generator;

a battery connected to the engine providing DC electric power to the engine;



an inverter connected to said binary and said induction generator, converting the DC electric power from said battery into AC electric power and providing the AC electric power as an exciting current having a frequency to said induction generator;

means for calculating an operation efficiency of said turbine based on the detection signals from said sensors; and

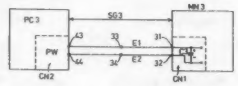
control means for controlling the frequency of the exciting current controlling said induction motor, thereby maintaining the calculated operation efficiency of said turbine at approximately maximum efficiency.

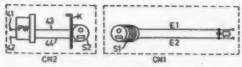
4,886,979

POWER SOURCE CIRCUIT DEVICE FOR MONITORS AND HOST COMPUTERS

San-Julie Chang, No. 5, Lane 359, Nei Hou Rd., Sec. 1, Taipei, Taiwan

Filed Mar. 1, 1988, Ser. No. 162,626
Int. Cl.[4] H02J *1/10*
U.S. Cl. 307—11 **3 Claims**





1. A power source device for a monochrome monitor and a monochrome host computer, said monitor and said host computer adapted to be functionally interconnected by signal lines, said monitor having DC powered internal circuitry, said host computer having a switching power supply circuit and a housing unit wall, said power source device comprising:

(a) a first power source means comprising:

(i) output terminals disposed in said monitor and electrically connected to said DC powered internal circuitry,

(ii) input terminals,

(iii) connecting means coupled to said input terminals, and

(iv) power lines associated with said connecting means for making a power connection to said connecting means; and

(b) a second power source means comprising:

(i) output terminals disposed in said host computer and electrically connected to said switching power supply circuit, and

(ii) a socket fixed in said housing unit wall, said socket being adaptable to be connected to said connecting means;

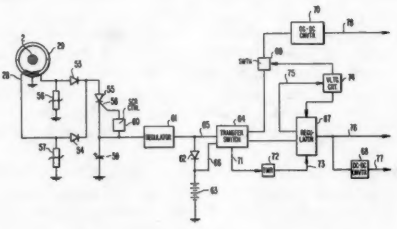
whereby DC power derived from said second power source means can be directly supplied to said monitor through said first power supply means so as to eliminate low-frequency and high-frequency interference with respect to said monitor and, further, to substantially reduce the manufacturing cost and weight of said monitor.

4,886,980

TRANSMISSION LINE SENSOR APPARATUS OPERABLE WITH NEAR ZERO CURRENT LINE CONDITIONS

Roosevelt A. Fernandes, Liverpool, N.Y., and Richard L. Sieron, Fairfield, Conn., assignors to Niagara Mohawk Power Corporation, Syracuse, N.Y.

Continuation of Ser. No. 795,167, Nov. 5, 1985, Pat. No. 4,808,917. This application Aug. 22, 1988, Ser. No. 234,688
Int. Cl.[4] H02J *9/00*
U.S. Cl. 307—64 **7 Claims**



1. A system for monitoring a plurality of parameters associated with each of a plurality of energized electrical power conductors, on power system circuits operable over a load range between predetermined minimum and maximum conductor currents in either direction, said system comprising:

(a) a plurality of sensor modules for measuring the parameters of said conductors while said conductors are energized, one of said modules being mounted upon each of said energized conductors;

(b) means carried by each of said modules for measurement of conductor voltage;

(c) means carried by each of said modules for measurement of the current through said conductor over said entire load range;

(d) means carried by each of said modules for processing and storing said sensed values of conductor voltage and conductor current;

(e) means carried by each of said modules for transmitting signals comprising a sequence of data commensurate with said measured values;

(f) power supply means for providing power to each of said processing means and each of said transmitting means from said conductor current when the latter is above a predetermined value;

(g) a rechargeable energy storage device in each of said modules for providing power to its respective processing

and transmitting means when said conductor current is below said predetermined value;

(h) charging means coupled to said power supply means and said storage device for float charging said storage device from said power supply means; and

(i) means remote from said modules for receiving said signals from said transmitting means of each of said plurality of sensor modules, decoding said signals and calculating voltage and current of each of said conductors.

4,886,981

SYNCHRONIZING CIRCUIT FOR A PLURALITY OF POWER UNITS

Salvatore Lentini, and Giuseppe Patti, both of Palermo, Italy, assignors to Italtel Societa Italiana, Milan, Italy

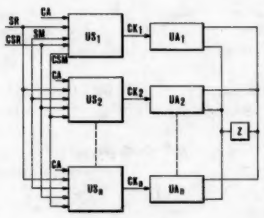
PCT No. PCT/EP76/00369, § 371 Date Feb. 3, 1987, § 102(e) Date Feb. 3, 1987, PCT Pub. No. WO87/00701, PCT Pub. Date Jan. 29, 1987

PCT Filed Jun. 20, 1986, Ser. No. 10,137

Claims priority, application Italy, Jul. 16, 1985, 21583 A/85

Int. Cl.[4] H02J *1/00;* **G04C** *11/00*

U.S. Cl. 307—87 **10 Claims**



1. A circuit for synchronizing a plurality of power units used in telecommunications systems, comprising:

synchronizing unit associated with each power unit, wherein each said synchronizing unit is designed to receive an activation signal on the input, to be connected to the remaining synchronizing units through a first and a second bus and to deliver a synchronizing clock signal to the respective power unit by the fact that the first synchronizing unit which receives said activation signal on its input is qualified as master unit and applies a predetermined polarity to the first bus and a clock signal to the second bus adapted to synchronize the remaining synchronizing units which, in response to the detection of said polarity on the first bus, are qualified as slave units, and by the fact that when the master synchronizing unit receives a switching off signal on the input, it modifies the polarity on the first bus thus enabling the unit whose output clock signal has the phase anticipated in comparison with the others, to be qualified as master unit.

4,886,982

POWER TRANSISTOR WITH IMPROVED RESISTANCE TO DIRECT SECONDARY BREAKDOWN

Flavio Villa, Milan, and Giovanni Siepe, Novara, both of Italy, assignors to SGS Microelettronica S.p.A., Catania, Italy

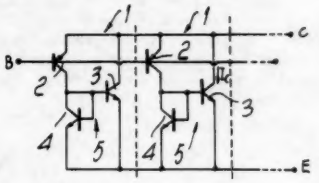
Filed Dec. 21, 1987, Ser. No. 135,220

Claims priority, application Italy, Dec. 30, 1986, 22899 A/86

Int. Cl.[4] H03K *17/60, 3/26;* **G05F** *3/16;* **H01L** *27/02*

U.S. Cl. 307—254 **5 Claims**

1. A power transistor with improved resistance to direct secondary breakdown, comprising a plurality of elementary transistors having emitter regions which are mutually connected and define a common emitter terminal, collector regions mutually short-connected and defining a common collector terminal, and base regions connected to at least one current source, and a plurality of diodes, each of said diodes being connected between base and emitter regions of a respective



elementary transistor of said plurality of elementary transistors and forming therewith a current mirror circuit.

4,886,983

RESET PULSE GENERATING DEVICE

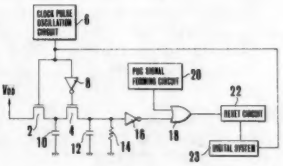
Hideo Taka, Tokyo, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 329,998, Dec. 11, 1981. This application Sep. 10, 1984, Ser. No. 649,152

Claims priority, application Japan, Dec. 26, 1980, 55-187169

Int. Cl.[4] H03K *17/22, 17/20, 5/153, 17/687*

U.S. Cl. 307—272.3 **19 Claims**



1. A reset pulse generating device for a digital system which is controlled by a clock pulse oscillation circuit and returned to the initial state by a reset pulse, including:

(a) charge storing means responsive to operation of said clock pulse oscillation circuit to be charged during oscillation of the oscillation circuit at a given charging rate;

(b) discharge means for discharging the charge storage means at a predetermined rate slower than the charging rate so that during operation of said clock pulse oscillation circuit, said charge storing means, despite being discharged, prevents its charge level from becoming lower than a predetermined value, and, after the operation of said clock pulse oscillation circuit stops, the charge level of said charge storing means is discharged below the aforesaid predetermined value; and

(c) detecting means for producing a reset pulse when the output of said charge storing means falls below said predetermined level.

4,886,984

PROHIBITION CIRCUIT UPON POWER-ON EVENT

Yuji Nakaoka, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

Filed Mar. 28, 1988, Ser. No. 172,750

Claims priority, application Japan, Mar. 27, 1987, 62-74901

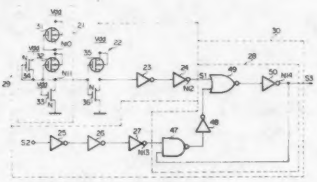
Int. Cl.[4] H03K *3/284, 5/13*

U.S. Cl. 307—272.3 **13 Claims**

1. A prohibition circuit operative to produce a control signal supplied to a power consuming circuit for a prohibition of an operation carried out by said power consuming circuit on the basis of an external signal shifted between an active first voltage level and an inactive second voltage level, said control

signal being shifted between an inactive third voltage level and an active fourth voltage level, comprising:

(a) a raw control signal producing circuit operative to produce a raw control signal shifted from an inactive fifth voltage level to an active sixth voltage level after a power switch on event, said raw control signal being shifted from said active sixth voltage level to said inactive fifth voltage level when a power voltage level excesses a certain voltage level; and



(b) an adjusting circuit responsive to said raw control signal and said external control signal and operative to produce said control signal of said active fourth voltage level when said raw control signal is shifted from said inactive fifth voltage level to said active sixth voltage level regardless of the voltage level of said external signal, wherein said adjusting circuit continues to produce said control signal of said active fourth voltage level regardless of the voltage level of said raw control signal until said external signal is shifted from said active first voltage level to said inactive second voltage level.

4,886,985

TRANSISTOR ARRANGEMENT WITH AN OUTPUT TRANSISTOR

Peter Flohrs; Klaus Heyke; Hartmut Michel, all of Reutlingen, and Ulrich Nelle, Sonnenbühl, all of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

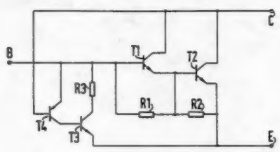
PCT No. PCT/DE87/00217, § 371 Date Dec. 23, 1988, § 102(e) Date Dec. 23, 1988, PCT Pub. No. WO88/00413, PCT Pub. Date Jan. 14, 1988

PCT Filed May 9, 1987, Ser. No. 307,089

Claims priority, application Fed. Rep. of Germany, Jun. 26, 1986, 3621396

Int. Cl.[4] H03K *3/26, 3/013, 17/60*

U.S. Cl. 307—315 **4 Claims**



1. Transistor arrangement, particularly for the fast switching of inductive loads, comprising a first transistor (T1) and a second transistor (T2) interconnected as a Darlington pair having a base terminal, an emitter terminal and a collector terminal; a third transistor (T3) having its collector connected to the base of the first transistor (T1) and its emitter connected to the emitter terminal (E); and a fourth transistor (T4) of a conductivity type opposite to that of the first, second and third transistors and having its base connected to the collector terminal (C), its emitter connected to the base terminal (B), and its collector connected to the base of the third transistor (T3).

4,886,986

OUTPUT SIGNAL PROCESSOR CIRCUIT OF CHARGE TRANSFER DEVICE

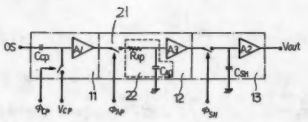
Takashi Watanabe, Kyoto, Japan, assignor to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Jul. 22, 1985, Ser. No. 757,176

Claims priority, application Japan, Jul. 25, 1984, 59-157852

Int. Cl.[4] H03K *5/08;* **G11C** *27/02*

U.S. Cl. 307—353 **4 Claims**



1. An output signal processor circuit of a charge transfer device, comprising:

charge-detect means for forming output signals of a charge transfer device, said output signals containing first and second levels;

clamp means for clamping said output signals from said charge-detect means at a predetermined level during an interval corresponding to said first level of said output signals;

integrating means connected to said clamp means, for integrating said output signals only during an interval corresponding to said second level of said output signals; and

sample-and-hold means for sampling said integrated signals and outputting signals corresponding to information stored in said charge transfer device,

said signals outputted by said sample-and-hold means being substantially free of high frequency noise components.

4,886,987

PROGRAMMABLE LOGIC ARRAY WITH 2-BIT INPUT PARTITIONING

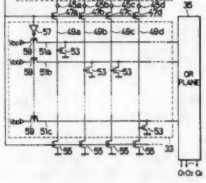
Kimiyoshi Usami, Kawasaki, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed May 11, 1988, Ser. No. 192,767

Claims priority, application Japan, May 27, 1987, 62-128365

Int. Cl.[4] H03K *19/177*

U.S. Cl. 307—465 **7 Claims**



1. A programmable logic array comprising:

input decoding means having a plurality of first transistor means each comprising a pair of transistors connected in series to each other and each first transistor means receiving a different combination of true and complementary input signals, said input decoding means providing logic output signals through respective ones of said first transis-

tor means as a function of said true and complementary input signals applied to said pair of transistors;

second transistor means coupled for precharging the input lines of an AND array in accordance with the logic output signals of said input decoding means and a received clock signal; and

third transistor means coupled for predischarging the input lines in accordance with the clock signal.

4,886,988

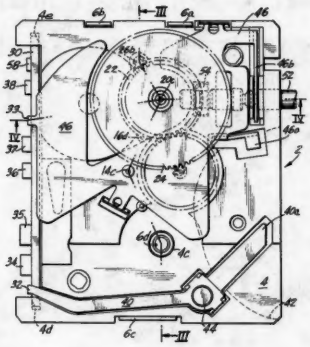
UNIVERSAL STEPPING MOTOR/GEAR TRAIN MODULE FOR A WRIST INSTRUMENT

Louis M. Galie, Sandy Hook, Conn.; Adolf Sedlak, Wurmberg, and Gerhard Stotz, Niefern, both of Fed. Rep. of Germany, assignors to Timex Corporation, Middlebury, Conn.

Filed Sep. 28, 1988, Ser. No. 250,184

Int. Cl.[4] H02K *37/00;* **G04C** *10/00*

U.S. Cl. 310—49 R **14 Claims**



1. A universal stepping motor/gear train module for a wrist instrument comprising:

a frame plate,

a bridge plate attached thereto and spaced therefrom,

a stepping motor comprising rotor and stator disposed between said plates,

a reduction gear train having gear members coupled to be driven by said rotor and having coaxial output members adapted to receive hands, said gear members being rotatably disposed between said plates,

an input/output circuit board disposed substantially perpendicular to said frame plate, and having a pair of power supply terminals,

said frame plate defining a recess large enough to receive at least a portion of a button energy cell, and

first and second spring contact connectors having ends adapted to contact the terminals of said energy cell, said connectors extending between said recess and said input-/output circuit board, whereby power may be either supplied to said board directly from said power supply terminals or from said energy cell.

4,886,989

MOTOR MOUNTING METHOD AND MEANS

Paul E. Britt, El Paso, Tex., assignor to Vebco, Inc., El Paso, Tex.

Filed Apr. 18, 1988, Ser. No. 182,508

Int. Cl.[4] H02K *5/10*

U.S. Cl. 310—89 **14 Claims**

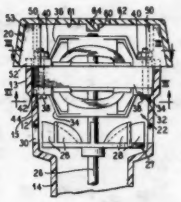
1. Motor mounting means for mounting a motor comprising, means forming a supporting surface within a hollow housing having an upstanding wall, said wall having housing lugs positioned on an outside thereof;

an electric motor on said supporting surface;

a driveshaft extending downward from said motor;

means indexing said motor within said housing;

restraining means holding said motor from rotational movement relative to said supporting surface and securing said motor upon said supporting surface;



an inverted cup-shaped cap capping said housing lugs located on an outside of said housing and posts located on an inside of said cap, and means interconnecting said lugs and posts;

means for indexing said cap relative to said housing comprising indexed flanges located on said cap and corresponding slots, located on and formed in said housing; and

a bolt head on said motor received within a recess located in said supporting surface.

4,886,990

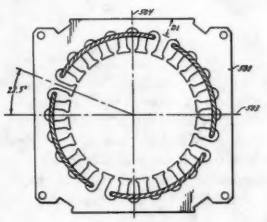
REVERSING PSC MOTOR DESIGN CAPABLE OF HIGH REVERSAL REPTITION RATE

Alan R. Barker, St. Charles, Mo., assignor to Emerson Electric Co., St. Louis, Mo.

Filed Aug. 2, 1988, Ser. No. 227,146

Int. Cl.[4] H02K *3/00;* **D06F** *13/02*

U.S. Cl. 310—184 **24 Claims**



1. A reversible permanent split capacitor motor comprising:

a stator assembly including a core having a generally parallelogram silhouette, said core being constructed from a plurality of stator laminations, each of said laminations having said silhouette, said core having a central opening defining a rotor receiving bore therein, and a plurality of radially extending receptacles opening onto said bore and defining winding receiving slots, said slots defining a plurality of teeth the radial inner extension of which defines said bore, and windings in said slots, said windings including at least a first winding and a second winding each having circumferentially spaced winding splits, said windings being electrically connectable so that said first winding delimits a main motor winding in a first direction of rotation and an auxiliary motor winding in a second direction of rotation, while said second winding delimits and auxiliary motor winding in said first direction of

rotation and a main motor winding in said second direction of rotation, each winding being operatively placed in said stator so that the maximum flux density in said core in the area of said winding splits is approximately equal in either direction of rotation of said motor;

rotor mounted for rotation in said bore; and

support means for said rotor operatively connected to said rotor and said stator.

4,886,991

ASYNCHRONOUS MOTOR FOR SPINNING ELEMENTS

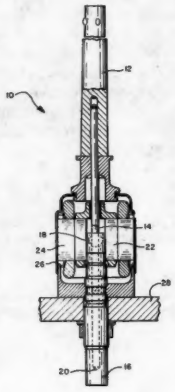
Ernest Braun, Biberach, Fed. Rep. of Germany, assignor to SKF Textilmaschinen-Komponenten GmbH, Stuttgart, Fed. Rep. of Germany

Filed Aug. 6, 1985, Ser. No. 763,032

Claims priority, application Fed. Rep. of Germany, Aug. 11, 1984, 3429651

Int. Cl.[4] H02K *17/20*

U.S. Cl. 310—212 **1 Claim**



1. In a spinning or twisting element having a spinning rotor mounted at one end of a drive shaft and an individual asynchronous motor of predetermined size for driving said element at the other end of said shaft, the improvement wherein said motor comprises an annular laminate stator having at least 24 poles and a double bar laminate armature located within said stator and fixed to the other end of said shaft, the thickness of each of the laminates forming each of said stator and armature being less than 0.3 mm to provide an increased number of laminates in said predetermined size.

4,886,992

ELECTRON SOURCE WITH MAGNETIC MEANS

Jacques Menet, Saint-Egreve, and Olivier de Gabrielli, Grenoble, both of France, assignors to Centre National De La Recherche Scientifique, Paris, France

Filed Jul. 20, 1988, Ser. No. 221,681

Claims priority, application France, Jul. 22, 1987, 87 10642

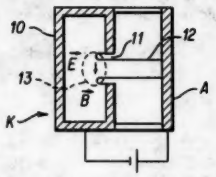
Int. Cl.[4] H01J *1/50*

U.S. Cl. 313—153 **5 Claims**

1. A plasma electron source in a low pressure chamber comprising:

an anode;

an equipotential cavity cathode structure, said cathode structure including a front plate facing said anode said front plate provided with an aperture; and



means for applying at said aperture a magnetic field perpendicular to said front plate.

4,886,993

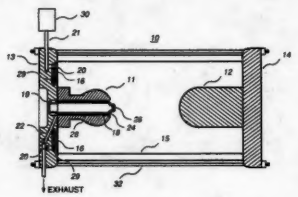
SPARK GAP SWITCH WITH SPIRAL GAS FLOW

John P. Brucker, Espanola, N. Mex., assignor to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Mar. 23, 1988, Ser. No. 172,096

Int. Cl.[4] H01J *17/26*

U.S. Cl. 313—231.51 **14 Claims**



1. A spark gap switch having first and second axially aligned electrodes spaced apart in a sealed housing and a contaminate removal system using an injected gas, comprising:

an annular plate concentric with said first electrode and defining vee-shaped peripheral grooves for said injected gas effective to form a spiral flow of said gas in said housing; and

means for removing said gas from said housing.

4,886,994

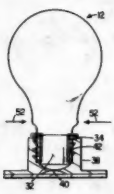
SNAP-IN LIGHT BULB

Albert J. Ragge, Jr., 760 Plain St., Bldg. 22, Apt. 12, Marshfield, Mass. 02050

Filed Nov. 1, 1988, Ser. No. 265,494

Int. Cl.[4] H01J *5/60*

U.S. Cl. 313—318 **8 Claims**



1. A snap-in light bulb for use in combination with a conven-

tional, threaded light bulb socket having a generally cylindrical inner wall of electricity-conductive mateial defining a light bulb base-receiving orifice, and further defining a generally helical thread extending about the inner wall surface,

said snap-in light bulb comprising:

a bulb through which light may be transmitted,

a light bulb base connected to said bulb, and

at least one arm resiliently connected to said light bulb base,

said arm comprising an electrical conductor element disposed for electricity-conducting contact with the inner wall surface of the conventional, threaded light bulb socket, said element in electrical contact with said light bulb base,

said arm having a plurality of spaced-apart lobe portions, said lobe portions configured and arranged for engagement about the generally helical thread of the conventional light bulb socket in a manner to maintain said light bulb disposed fixedly within the socket,

said arm adapted for resilient movement toward said light bulb base, thereby to provide clearance between said plurality of lobe portions and the inner wall surface of the conventional light bulb socket such that said light bulb may be inserted axially into the conventional light bulb socket, and

said arm adapted for resilient movement toward said light bulb base, thereby to provide clearance between said plurality of lobe portions and the inner wall surface of the conventional light bulb socket such that said light bulb may be inserted axially into the conventional light bulb socket, and

said arm adapted to move resiliently outward thereby to engage said lobes about the thread of the conventional light bulb socket to hold said light bulb in the socket, and

said arm adapted to permit said light bulb to be removed axially from the conventional light bulb socket.

4,886,995

HEATER FOR INDIRECTLY-HEATED CATHODE

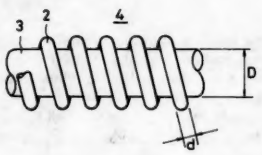
Hiroshi Takakura, and Sachio Koizumi, both of Mobara, Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Aug. 18, 1986, Ser. No. 897,216

Claims priority, application Japan, Sep. 4, 1985, 60-193709

Int. Cl.[4] H01J *1/16*

U.S. Cl. 313—344 **6 Claims**



1. A heater for an indirectly-heated cathode comprising a coiled heater composed of a core wire for a cathode heater wound around a mandrel to form a winding, characterized in that the largest inner diameter of said winding is 4.3 to 6.0 times the diameter of said core wire.

4,886,996

CHANNEL PLATE ELECTRON MULTIPLIERS

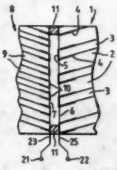
Ronald L. Field, Woldingham, and Richard S. Emptage, Mitcham, both of England, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Feb. 24, 1988, Ser. No. 159,879

Claims priority, application United Kingdom, Mar. 18, 1987, 8706441

Int. Cl.[4] H01J *43/02, 43/22, 1/32*

U.S. Cl. 313—400 **6 Claims**



1. A particle counting apparatus comprising a stack of glass channel electron multiplier plates, conductive electrodes provided on end faces of the stack between which a potential difference can be applied, an anode adjacent an output end face of the stack to collect electrons issuing from the channels, means for directing the particles to be counted onto the stack input end face, characterised in that the stack of glass channel plates are bonded together by a layer of indium on opposed faces of adjacent channel plates, said layer penetrating into said channels and forming a coating on the interior walls thereof.

4,886,997

COLOR PICTURE TUBE WITH SHADOW MASK SUPPORT ASSEMBLY

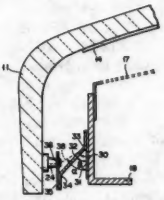
Masatsugu Inoue; Kiyoshi Tokita, both of Fukaya, and Kazunori Nakane, Fukiage, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Mar. 2, 1988, Ser. No. 163,100

Claims priority, application Japan, Mar. 6, 1987, 62-50199

Int. Cl.[4] H01J *29/07*

U.S. Cl. 313—406 **11 Claims**



1. A color picture tube comprising:

a CRT envelope having a substantially rectangular front panel and a central line axis;

a phosphor screen formed on an inner surface of said front panel;

a shadow mask assembly including (a) a shadow mask, (b) a supporting assembly detachably mounting the shadow mask on said front panel adjacent to said phosphor screen and (c) a frame surrounding said shadow mask, said supporting assembly comprising:

stud pins projecting from the four corners of said front panel, and

spring members having two ends, one end being fixed to a corresponding one of the four corners of said frame and the other end being detachably engaged with a corre-

sponding one of said stud pins, each said spring member including:

an elastically deformable portion located between said end fixed to said frame and said other end detachably engaged with the corresponding one of said stud pins, said elastically deformable portion and said central line axis of the CRT envelope defining an acute angle β and a line connecting an end portion of said elastically deformable portion on the side of said frame with said stud pin and the central line axis of the CRT envelope defining an acute angle α, wherein:

angle β<angle α.

4,886,998

ELECTRON GUN ELECTRODE FOR A COLOR PICTURE TUBE

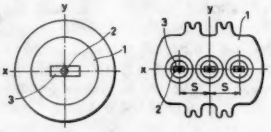
Satoru Endo, Mobara, Japan, assignor to Hitachi, Ltd., Tokyo, Japan

Filed Jan. 25, 1988, Ser. No. 147,988

Claims priority, application Japan, Jan. 26, 1987, 62-14022; Jan. 26, 1987, 62-14021; Mar. 20, 1987, 62-63797

Int. Cl.[4] H01J *29/48, 29/02*

U.S. Cl. 313—414 **3 Claims**



1. An electrode of a color picture tube electron gun with a slit recess provided on the periphery of an electron beam pass aperture, characterized in that said recess is rectangularly formed on one surface of said electrode, the edges of said recess being stepped perpendicularly from said one surface, and the thickness of said electrode is 0.4 to 1.0 times the diameter of said electron beam pass aperture at the portion at which said recess is to be formed and the thickness of said recess is uniform and 0.1 to 0.2 times the diameter of said electron beam pass aperture.

4,886,999

CATHODE RAY TUBE APPARATUS WITH QUADRUPOLE ELECTRODE STRUCTURE

Hisakazu Yamane; Ritsuo Ishida; Hisao Nakanishi; Keiji Yanai; Masayuki Toshiyasu, all of Nagaokakyo; Kazunori Ikegami; Soichiro Okuda, both of Amagasaki; Kenji Kimura, Nagaokakyo; Koji Ishibata, Nagaokakyo, and Yoshinori Ishii, Nagaokakyo, all of Japan, assignors to Mitsubishi Denki Kabushiki Kaishi, Tokyo, Japan

Continuation of Ser. No. 34,021, Apr. 3, 1987, abandoned. This application Jan. 11, 1989, Ser. No. 295,883

Claims priority, application Japan, Apr. 3, 1986, 61-77057; Apr. 3, 1986, 61-77058; Apr. 3, 1986, 61-77056; Apr. 8, 1986, 61-82629; Apr. 8, 1986, 61-82625; Apr. 8, 1986, 61-82626; Apr. 8, 1986, 61-82627; Apr. 8, 1986, 61-82623; Apr. 8, 1986, 61-82624; Apr. 28, 1986, 61-100624; Apr. 30, 1986, 61-102793; Jun. 18, 1986, 61-142401; Jun. 24, 1986, 61-148941; Sep. 3, 1986, 61-208408; Sep. 16, 1986, 61-218582; Sep. 25, 1986, 61-228731; Feb. 18, 1987, 62-36271

Int. Cl.[4] H01J *29/46*

U.S. Cl. 313—414 **58 Claims**

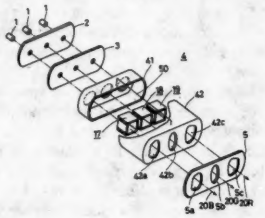
1. A cathode ray tube apparatus comprising:

three cathodes linearly arranged with each other in a first direction for emission of respective electron beams therefrom;

a focusing electrode having first, second and third apertures defined therein for the passage of the respective electron beams therethrough;

a quadrupole electrode structure including first, second and third quadrupole electrodes, one for each electron beams, each of said quadrupole electrodes including,

a pair of horizontal electrode pieces spaced a predetermined distance from each other in a second direction perpendicular to the first direction and positioned upwardly and downwardly, respectively, with respect to the associated electron beam, and



a pair of vertical electrode pieces spaced a predetermined distance from each other in a direction aligned with the first direction and positioned leftwards and rightwards with respect to such associated electron beam, each of said horizontal and vertical electrode pieces being in platelike form elongated along the respective electron beams; and

power source means for applying a predetermined voltage to the quadrupole electrode structure.

4,887,000

ELECTRON BEAM GENERATION APPARATUS

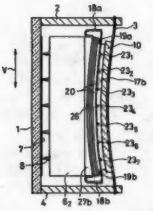
Fumio Yamazaki, Hirakata, and Toshifumi Nakatani, Moriguchi, both of Japan, assignors to Sushita Electric Industrial Co., Ltd., Kadoma, Japan

Filed Nov. 5, 1987, Ser. No. 116,848

Claims priority, application Japan, Nov. 6, 1986, 61-265104; Nov. 6, 1986, 61-265105; Nov. 11, 1986, 61-269422

Int. Cl.[4] H01J *63/02, 19/12*

U.S. Cl. 313—422 **11 Claims**



1. An electron beam generation apparatus comprising:

at least one line cathode stretched between a pair of holding means for holding said at least one line cathode at both ends thereof;

an electron beam take-out electrode provided on a front side of said at least one line cathode with a predetermined gap therefrom;

a back electrode provided on a back side of said at least one line cathode with a predetermined gap therefrom; and

plural cathode position defining means disposed at predetermined positions along said at least one line cathode for shaping it into a forward convex arc which protrudes at its center toward the electron beam take-out electrode.

4,887,001

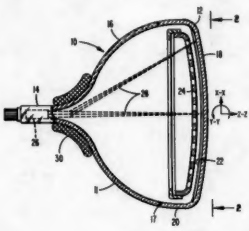
CATHODE-RAY TUBE HAVING FACEPLATE PANEL WITH ESSENTIALLY PLANAR SCREEN PERIPHERY

Ralph J. D'Amato; Richard H. Godfrey; Albert M. Morrell, and Frank R. Ragland, Jr., all of Lancaster, Pa., assignors to RCA Licensing Corporation, Princeton, N.J.

Continuation of Ser. No. 814,164, Dec. 23, 1985, abandoned, which is a continuation of Ser. No. 529,644, Sep. 6, 1983, abandoned. This application Apr. 25, 1989, Ser. No. 342,677

Int. Cl.[4] H01J *29/10, 29/86*

U.S. Cl. 313—461 3 Claims



1. In a cathode-ray tube including a rectangular faceplate with two long sides and two short sides wherein the long sides of the faceplate substantially parallel a centrally located major axis of the tube and the short sides of the faceplate substantially parallel a centrally located minor axis of the tube, said faceplate having an exterior surface having curvature along both its minor and major axes and said faceplate having a cathodoluminescent screen on an interior surface thereof, said tube including an electron gun therein for generating and directing at least one electron beam toward said screen, and wherein, at least in a center portion of the faceplate, a curvature along the minor axis is at least 10 percent greater than the curvature along the major axis; the improvement comprising

points along the major axis on said exterior surface, located at the edges of said screen, lying in a first plane which is perpendicular to a central longitudinal axis of said tube;

points along the minor axis on said exterior surface, located at the edges of said screen, lying in a second plane which is spaced from and parallel to said first plane;

points along the diagonals of said faceplate on said exterior surface, located at the corners of said screen, lying in a third plane which is spaced from and parallel to said first plane;

said first, second and third planes being spaced from a fourth plane, which is parallel to said first, second and third planes and is tangent to the center portion of said faceplate, in the order of said second plane, said first plane and said third plane;

the ratio of the spacing between said second and fourth planes, measured along the central longitudinal axis of said tube, to the spacing between said third and fourth planes being greater than the minor axis dimension of the screen, squared, divided by the diagonal dimension of the screen, squared, and less than one;

the ratio of the spacing between said first and fourth planes, measuredalong the central longitudinal axis of said tube, to the spacing between said third and fourth planes being greater than the major axis dimension of the screen, squared, divided by the diagonal dimension of the screen, squared, and less than one; and

the exterior surface curvature along said minor axis essentially being circular from the center of said faceplate to said second plane, and the exterior surface curvature along said major axis essentially being circular near the center of said faceplate and increasing in curvature near the sides of said faceplate to said first plane.

4,887,002

GAS DISCHARGE LAMP AND APPARATUS UTILIZING THE SAME

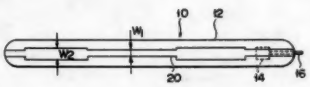
Yoshitomi Dobashi, Fujisawa, and Akihiro Inoue, Chigasaki, both of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Dec. 1, 1987, Ser. No. 127,486

Claims priority, application Japan, Dec. 1, 1986, 61-286410

Int. Cl.[4] H01J *61/78*

U.S. Cl. 313—607 10 Claims



10. A gas discharge lamp apparatus comprising:

a gas discharge lamp device including a tube having a discharge gas therein, an internal electrode provided within said tube, and an external electrode provided on an outer surface of said tube generally parallel to an axis of said tube, said external electrode having a width that is non-uniform along said axis, the width at various positions along said axis being selected so as to obtain a desired luminance distribution; and

a high frequency power source for applying high frequency power to said internal and external electrodes of said gas discharge lamp device to cause discharge within said tube and irradiating visible rays generated by said discharge to the outside of said tube.

4,887,003

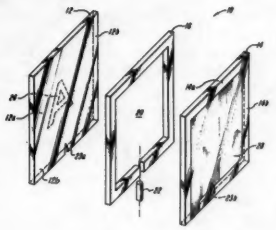
SCREEN PRINTABLE LUMINOUS PANEL DISPLAY DEVICE

William P. Parker, Box 909, Waitsfield, Vt. 05673-0909

Filed May 10, 1988, Ser. No. 192,225

Int. Cl.[4] H01J *61/30*

U.S. Cl. 313—634 27 Claims



1. A luminous panel display device comprising:

A. a first rigid, non-conductive, substantially planar sheet member having front and back surfaces, said first sheet member having a coating region on portions of its front surface, said coating region being adapted to receive a first conductive coating representative of a predetermined image;

B. a second rigid, non-conductive, substantially planar sheet member having front and back surfaces, wherein at least one of said first and second sheet members is transparent;

C. spacer means for mutually positioning said first and second sheet members whereby the back surface of said first sheet member is offset by a predetermined separation from and opposite the front surface of said second sheet member;

D. discharge chamber means for establishing a gas impervious seal between portions of the back surface of said first sheet member and the front surface of said second sheet

member to define a closed region in the gap between said back surface of said first sheet member and the front surface of said second sheet member and underlying said coating region;

E. electroluminescent gas disposed within said closed region; and

F. a second conductive coating disposed on a portion of one of the front and back surfaces of said second sheet member underlying at least in part said closed region and a portion of said coating region.

4,887,004

EMERGENCY LIGHTING SYSTEM

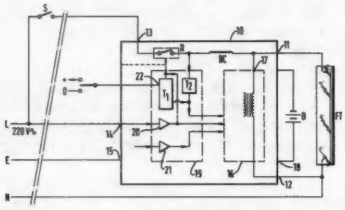
Wouter Kraaij, Someren-eind, and Meindert Visser, Valkenswaard, both of Netherlands, assignors to Fano International Limited, Gibralter, United Kingdom

Filed Oct. 30, 1987, Ser. No. 115,169

Claims priority, application United Kingdom, Oct. 31, 1986, 8626132

Int. Cl.[4] H05B *41/14*

U.S. Cl. 315—86 **4 Claims**



1. An emergency lighting system, comprising:

electrical battery means;

a converter circuit powered by said electrical battery means;

a lighting unit comprising a gas discharge light connected to said converter circuit, circuit means for connecting said gas discharge light to an electrical mains supply and including a switch for turning on the light from the mains;

means for detecting low mains voltage so that when said gas discharge light is off, said converter circuit is activated in order to generate a high voltage from said electrical battery means for striking a discharge in said light;

means for activating said converter circuit to provide a low voltage from said electrical battery means for maintaining the discharge in said light once the discharge has been struck;

means responsive to said switch if the mains supply is of operable mains voltage for activating the converter circuit to generate its high voltage from the battery means to strike a discharge in said light; and,

means for maintaining the discharge from the mains supply after it has been struck.

4,887,005

MULTIPLE ELECTRODE PLASMA REACTOR POWER DISTRIBUTION SYSTEM

J. Kirkwood H. Rough, 264 S. 14th St., San Jose, Calif. 95112, and Peter W. Rose, 1000 Almanor Ave., Menlo Park, Calif. 94025

Filed Sep. 15, 1987, Ser. No. 97,592

Int. Cl.[4] H05B *31/26*

U.S. Cl. 315—111.21 **12 Claims**

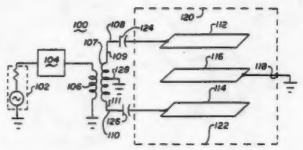
1. A multiple electrode plasma reactor power circuit comprising:

an RF generator;

a matching network being electrically connected to said RF generator;

at least one reaction chamber having a total of at least two powered electrodes disposed within said chambers and at least one grounded surface disposed in each said chamber, said powered electrodes and said grounded surfaces being positioned relative to each other such that at least one plasma for each powered electrode is created between said powered electrode and said grounded surface upon the application of RF power thereto;

an electrode power circuit disposed between said matching network and said powered electrodes to feed RF power from said matching network to said powered electrodes, said electrode power circuit including a circuit means having an input power line connected from said matching



network and having output power lines connected to said powered electrodes and operative to split said RF power among said powered electrodes; said circuit means supplying a voltage to each powered electrode that is in phase with the voltage supplied to each other powered electrode; said circuit means being automatically reactive to changes in the impedance between various ones of said powered electrodes and said grounded surfaces to alter the RF power applied to each said powered electrode to balance said plasmas generated between each said powered electrode and said ground surfaces.

4,887,006

DIMMER CONTROL CIRCUIT

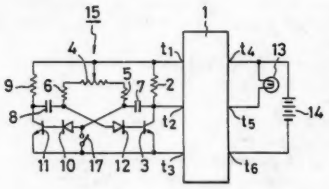
Junichi Kuratani, Miyagi, Japan, assignor to Alps Electric Co., Ltd., Tokyo, Japan

Filed Jun. 9, 1988, Ser. No. 204,484

Claims priority, application Japan, Sep. 17, 1987, 62-140857[U]

Int. Cl.[4] H02H *3/20*; H05B *39/04*

U.S. Cl. 315—209 R **6 Claims**



1. An improved dimmer control circuit having a time constant regulating means provided in a multivibrator for regulating a load time ratio of an output pulse signal generated by said multivibrator, said output pulse being used to control, ON or OFF, a voltage applied to a lamp to thereby regulate luminous intensity of said lamp, said improvement comprising:

switch means connected within said multivibrator for rendering said multivibrator inoperative when said switch means is actuated, said switch means being actuated by said time constant regulating means when said time constant regulating means is in a position corresponding to maximum luminous intensity of said lamp, said multivibrator, when rendered inoperative, precluding flickering of said lamp during maximum luminous intensity.

4,887,007

DC-AC CONVERTER FOR SUPPLYING A GAS AND/OR VAPOUR DISCHARGE LAMP

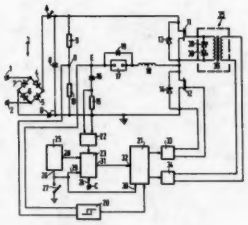
Antonius F. J. Almering, Breda, and Henri A. I. Melai, Eindhoven, both of Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Feb. 3, 1988, Ser. No. 151,769

Claims priority, application Netherlands, Feb. 18, 1987, 8700405

Int. Cl.[4] H05B 37/00

U.S. Cl. 315—243 20 Claims



1. A DC-AC converter for supplying a gas and/or vapour discharge lamp comprising: two input terminals for connection to a source of supply voltage, means connecting a series arrangement of at least first and second semiconductor switching elements across said two input terminals, means connecting one of the semiconductor switching elements in a series circuit with a capacitor, the lamp and an inductance across said input terminals in the lamp operating condition, an approximately square-shaped alternating current flowing through the lamp in the operating condition, characterized in that a first rectifier is connected parallel to the first semiconductor switching element and a second rectifier is connected parallel to the second semiconductor switching element, the cathodes of the rectifiers being connected to that electrode of its parallel semiconductor switching element which has the highest voltage during operation, and a control circuit which comprises a switching element coupled to said first and second semiconductor switching elements, said switching element having two operating states, the control circuit in the first operating state rendering the second semiconductor switching element conducting and non-conducting more than once while the first semiconductor switching element is non-conducting and in the second operating state rendering the first semiconductor switching element conducting and non-conducting more than once while the second semiconductor switching element is non-conducting.

4,887,008

ELECTRODELESS LAMP BULB OF MODIFIED SHAPE FOR PROVIDING UNIFORM EMMISSION OF RADIATION

Charles H. Wood, Rockville, Md., assignor to Fusion Systems Corporation, Rockville, Md.

Continuation of Ser. No. 736,580, May 21, 1985, abandoned. This application Apr. 19, 1988, Ser. No. 186,657

Claims priority, application Japan, Jun. 14, 1984, 59-120873

Int. Cl.[4] H01J 7/00

U.S. Cl. 315—39 3 Claims

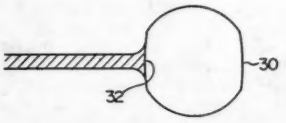
1. A microwave generated electrodeless lamp comprising,

microwave energy generating means,

a microwave chamber which includes a mesh through which radiant energy exits the lamp,

means for coupling microwave energy from said generating means to said chamber such that there is set up in said chamber an electromagnetic field having a relatively uniform electric field portion and other electric field portions having a different strength than said relatively uniform electric field portion, and

an electrodeless lamp bulb disposed in said chamber which is filled with material which forms a plasma when ionized and which has the shape of a sphere having two opposed relatively flattened portions which face each other,



said lamp bulb being positioned in said chamber so that its volume encompasses substantially only said relatively uniform electric field portion and such that other field portions of different strength than said relatively uniform portion lie outside said bulb adjacent said relatively flattened portions.

4,887,009

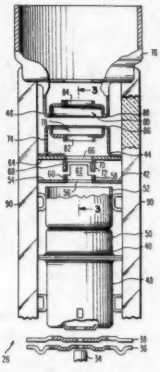
COLOR DISPLAY SYSTEM

Stanley Bloom, Bridgewater Township, Somerset County, and Eric F. Hockings, Princeton, both of N.J., assignors to RCA Licensing Corporation, Princeton, N.J.

Filed Feb. 12, 1986, Ser. No. 828,523

Int. Cl.[4] G09G 1/04

U.S. Cl. 315—368 15 Claims



9. In a color display system including a cathode-ray tube having an inline electron gun for generating and directing three electron beams along paths toward a screen of said tube, said gun including electrodes comprising a beam-forming region and electrodes for forming a main focusing lens, and said system including a self-converging yoke that produces an astigmatic magnetic deflection field, the improvement comprising

electrodes in said electron gun for forming a quadrupole lens between the beam-forming region and the main focusing lens in each of the electron beam paths wherein each quadrupole lens is oriented to provide a correction to an associated electron beam to at least partially compensate for the effect of the astigmatic magnetic deflection field on the associated beam, said quadrupole lens being located closer to said main focusing lens than to said beam forming region, wherein said electrodes for forming a quadrupole lens include two electrodes, a first quadrupole lens elec-

trode and a second quadrupole lens electrode, said second quadrupole lens electrode being connected to one of said electrodes for forming a main focusing lens, and said first quadrupole lens electrode being located between the second quadrupole lens electrode and the beam-forming region and facing the second quadrupole lens electrode,

means for applying a dynamic signal to at least one of said electrodes for forming a quadrupole lens, said dynamic signal being related to deflection of the electron beams, and

wherein each electrode for forming a quadrupole lens includes two opposed sector portions of a cylinder, the sector portions on one electrode being interdigitated with the sector portions on the other electrode and a quadrupole lens being formed by the interdigitated spaced sector portions.

4,887,010

DISPLAY DEVICE USING SHADOWMASK CRT

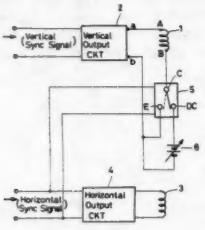
Takeo Fujimura, Nagaokakyo, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Feb. 24, 1989, Ser. No. 314,941

Claims priority, application Japan, Feb. 26, 1988, 63-045132

Int. Cl.[4] H01J *29/56*

U.S. Cl. 315—370 **11 Claims**



1. A display device which comprises:

a color cathode ray tube including a finely perforated shadow mask having a multiple of minute apertures defined therein in a predetermined pattern in a vertical direction relative to scanning lines depicted by electron beams;

a horizontal deflecting means for causing the scanning lines to sweep in a horizontal direction;

a vertical deflecting means for displacing the scanning lines of the electron beams in a vertical direction to permit the scanning lines to assume equally spaced relationship with each other; and

a scanning line position adjusting means for displacing every other scanning line from the total number of the scanning lines in the vertical direction in a quantity required to minimize the appearance of Moire pattern.

4,887,011

COMPUTER MONITOR VERTICAL SWEEP GENERATOR HAVING FREQUENCY INDEPENDENT HEIGHT CONTROL AND "S" WAVEFORM CORRECTION

Carl R. Haynie, 4738 Jan Dr., Carmichael, Calif. 95608; Kirk P. Gipson, 2271 Independence Way, Roseville, Calif. 95678, and Gary H. Nichols, 2570 Shirland Tract Rd., Auburn, Calif. 95603

Filed Feb. 23, 1989, Ser. No. 314,601

Int. Cl.[4] H01J *29/70, 29/76*

U.S. Cl. 315—403 **3 Claims**

1. A signal generator for generating an amplified yoke signal, the signal generator comprising:

linear ramp generator means for producing a ramp signal with a ramp-shaped voltage waveform, the linear ramp generator including

a first input for receiving a clock signal, an oscillation frequency of the clock signal determining an oscillation frequency of the ramp signal,

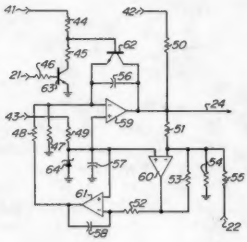
a second input for receiving a height adjustment signal,

a linear ramp generator output upon which the ramp signal is placed,

ramp integrator means, coupled to the first input and the linear ramp generator output, for generating the ramp signal, the ramp signal having a same oscillation frequency as the clock signal, and for placing the ramp signal upon the linear ramp generator output, and

low pass filter means, coupled to the second input and to the ramp integrator means, for, responsive to the height adjustment signal, varying peak voltage of the ramp signal independent of the frequency of the clock signal;

correction generator means for generating an "S" correction signal, the correction generator means including



a correction generator input coupled to the linear ramp generator output,

frequency independent generator means for receiving the ramp signal from the correction generator input and for generating the "S" correction signal, the amount of voltage adjustment not being dependent upon the frequency of the ramp signal, and

a correction generator output upon which the "S" correction signal is placed;

summation means coupled to the linear ramp generator output and the correction generator output for summing the ramp signal and the "S" correction signal to generate an unamplified yoke signal, the summation means having a summation output upon which the unamplified yoke signal is placed; and,

amplifier, coupled to the summation output, for receiving the unamplified yoke signal and producing the amplified yoke signal.

4,887,012

INJECTION CONTROL APPARATUS FOR INJECTION MOLDING MACHINE

Nobuyuki Kiya, and Keiji Sakamoto, both of Hachioji, Japan, assignors to Fanuc Ltd., Minamitsuru, Japan

PCT No. PCT/JP86/00167, § 371 Date Dec. 8, 1986, § 102(e) Date Dec. 8, 1986, PCT Pub. No. WO86/06021, PCT Pub. Date Oct. 23, 1986

PCT Filed Apr. 7, 1986, Ser. No. 2,649

Claims priority, application Japan, Apr. 8, 1985, 60-72826

The portion of the term of this patent subsequent to Jul. 26, 2005, has been disclaimed.

Int. Cl.[4] B29C *45/50, 45/77*

U.S. Cl. 318—434 **5 Claims**

1. An injection molding machine comprising:

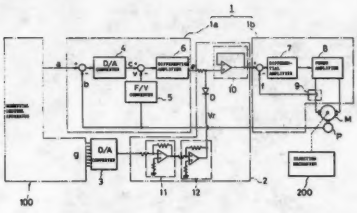
injection means;

a servomotor as a driving means operatively connected to said injection means;

instruction means for outputting an operating instruction and a torque limit instruction;

a first controller, operatively connected to said instruction means, for receiving said operating instruction from said instruction means;

a second controller, operatively connected between said first controller and said servomotor, for driving said servomotor, said first controller being operable to supply said second controller with a first torque instruction for accelerating rotational speed of said servomotor at an early stage of the injection operation, and supply said second controller with a second torque instruction for decelerating rotational speed of said servomotor at a latter stage of the injection operation; and



torque limit means, operatively connected between said first and second controllers, for receiving said torque limit instruction from said instruction means, said torque limit means being operable to limit said first torque instruction from said first controller up to said torque limit instruction and deliver the limited first torque instruction to said second controller, said torque limit means being operable to deliver said second torque instruction from said first controller to said second controller without limiting said second torque instruction.

4,887,013

FAILSAFE BRAKE FOR A MULTI-WHEEL VEHICLE WITH MOTOR CONTROLLED STEERING

Thomas J. Doth, Dallas, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Division of Ser. No. 771,379, Aug. 30, 1985, abandoned. This application Dec. 4, 1987, Ser. No. 129,914

Int. Cl.[4] B62D *15/00, 5/04*

U.S. Cl. 318—489 **6 Claims**

1. A braking system for a mobile apparatus comprising: at least two independently steerable wheels on said apparatus;

a power source for controlling the angle that each of said wheels makes with the mobile apparatus for steering; and

means for changing the angle between the wheels in order to brake the apparatus, including an auxiliary power source operable automatically upon failure of the power source for steering.

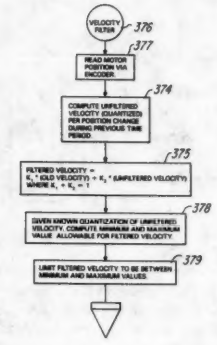
2. A brake for stopping an electrically powered automatically guided mobile robot upon failure of the source of electrical power for the robot, comprising:

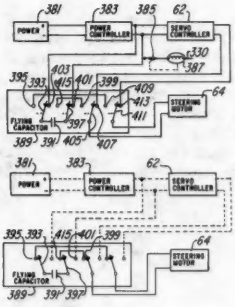
a steering wheel steer motor;

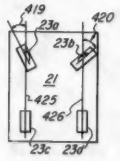
a four pole, double throw relay which is energized by the robot electrical power source and which is de-energized upon failure of the robot electrical power source;

wherein a first two relay poles connect a capacitor to the power source when the relay is energized, to charge the capacitor and wherein the first two relay poles cooperate with a second two relay poles to connect the capacitor to the steer motor when the relay is de-energized;

wherein the second two relay poles connect steering control signals to the steer motor when the relay is energized, and wherein the second two relay poles cooperate with the first two relay poles to connect the capacitor to the steer motor when the relay is de-energized; and







wherein the stored charge causes the steer motor to change the angle between two wheels and thereby brake the robot.

4,887,014

INDUSTRIAL ROBOT CONTROL DEVICE

Hisao Kato, Aichi, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Feb. 16, 1988, Ser. No. 156,137

Claims priority, application Japan, Feb. 16, 1987, 62-32697; Feb. 16, 1987, 62-32699

Int. Cl.[4] G05B *19/10*

U.S. Cl. 318—568.11 **9 Claims**

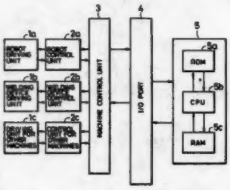
1. A control device for controlling a plurality of machines including industrial robots provided in a single production line comprising:

means for calculating a total amount of voltage drop caused by actuations of said machines according to respective driving programs therefor at a predetermined monitoring interval;

means for judging whether or not the total amount of voltage drop is equal to or smaller than a predetermined level;

means for selecting at least one of said machines so that a total amount of voltage drop caused in said selected machines is made equal to or smaller than the predetermined level, when the total amount of voltage drop caused in all of said machines exceeds the predetermined level; and

means for applying drive instruction signals to said machines selected by said selecting means.



4,887,015

POSITION CONTROL SYSTEM

Mitsuo Kurakake, Hino, and Keiji Sakamoto, Hachioji, both of Japan, assignors to Fanuc Ltd., Minamitsuru, Japan

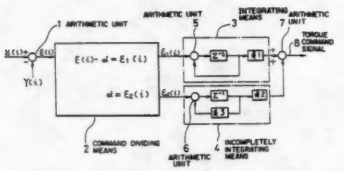
PCT No. PCT/JP87/00875, § 371 Date Jun. 29, 1988, § 102(e) Date Jun. 29, 1988, PCT Pub. No. WO88/03678, PCT Pub. Date May 19, 1988

PCT Filed Nov. 11, 1987, Ser. No. 221,243

Claims priority, application Japan, Nov. 12, 1986, 61-269445

Int. Cl.[4] G05B *11/36*

U.S. Cl. 318—609 **10 Claims**



1. A position control system having a speed control loop for generating a torque command signal for a motor from a speed deviation between a speed command and an actual speed of the motor, said position control system comprising:

command subdividing means for dividing the speed deviation into a minute amount and a remaining amount;

integrating means for integrating the remaining amount to produce a first output;

incompletely integrating means for incompletely integrating the minute amount to produce a second output; and

arithmetic means for adding the first output from said integrating means and the second output from said incompletely integrating means, to produce a sum issued as the torque command signal.

4,887,016

PORTABLE ROBOT WITH AUTOMATIC SET-UP

Franklin S. Malick, Monroeville, Pa., assignor to Viking Systems International, Inc., Pittsburgh, Pa.

Filed Sep. 21, 1987, Ser. No. 98,551

Int. Cl.[4] G05B *19/42*

U.S. Cl. 318—568.13 **16 Claims**

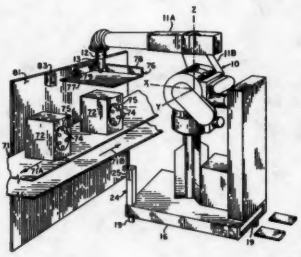
1. A method for defining an intangible robotic memory frame in a robotic memory of a mobile robot to match a tangible reference structure at each of separate workstations for the robot or each time the robot is newly positioned at a workstation, said method including the steps of;

newly positioning the mobile robot at one of said workstations;

using a position sensor on a robotic arm of said mobile robot to establish a first intangible robotic memory frame matching a first plane of said tangible reference structure;

using said position sensor and the first intangible robotic memory frame to establish a second intangible robotic memory frame which matches the first tangible plane and a second tangible plane perpendicular to said first plane of said tangible reference structure, said second intangible robotic memory frame includes said first intangible robotic memory plane and;

using said position sensor and said second intangible robotic memory frame to establish a third intangible robotic memory frame which matches the first and second tangible planes and a third tangible plane perpendicular to said first plane and said second plane of said tangible reference structure, said third intangible robotic memory frame includes said second intangible robotic memory frame.



4,887,017

SEAT ANGLE REGULATING APPARATUS

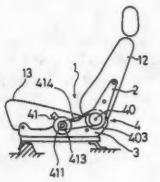
Sadao Ito, Toyoake, Japan, assignor to Aisin Seiki Kabushiki Kaisha, Kariya, Japan

Filed Oct. 6, 1987, Ser. No. 105,037

Claims priority, application Japan, Oct. 14, 1986, 61-243761

Int. Cl.[4] G05G *5/00*

U.S. Cl. 318—626 **13 Claims**



1. A seat angle regulating apparatus comprising:

an upper arm mounted to a seat back of a seat;

a lower arm mounted to a seat cushion of said seat;

an internal gear having a first set of teeth, and an external gear having a second set of teeth, said second set of teeth numbering at least one less than said first set of teeth, said internal and external gears in mesh between said upper arm and said lower arm for regulating a relative angle between said upper arm and said lower arm;

an angle regulating unit having an eccentric shaft for rotatably supporting either of said internal gear or said external gear at a concentric portion thereof and rotatably supporting the other gear at an eccentric portion thereof and

engaging said internal gear and external gear, and a motor for rotating said eccentric shaft; and

a locking unit for engaging and disengaging said angle regulating unit to and from either of said upper arm or said lower arm and changing the relative angle between said upper arm and said lower arm independently of said angle regulating unit when said angle regulating unit is disengaged;

said angle unit including a motor rotation control unit for controlling a forward and backward rotation range of said motor and enabling the rotation of said motor within said rotation range.

4,887,018

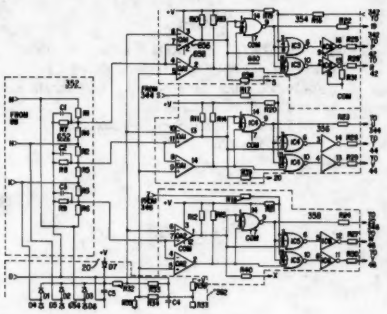
LINE TO LINE TO LINE TO NEUTRAL CONVERTER

James T. Libert, Waukesha, Wis., assignor to Square D Company, Palatine, Ill.

Division of Ser. No. 707,186, Mar. 1, 1985, which is a continuation of Ser. No. 443,001, Nov. 19, 1982, abandoned. This application Feb. 28, 1986, Ser. No. 834,685

Int. Cl.[4] H02P *1/28*

U.S. Cl. 318—778 **2 Claims**



1. In a reduced voltage starter having a semiconductor switch circuit for controlling the application of power to a motor from a three phase power source, each phase of said three phase source having a phase adjacent thereto which, in turn, is adjacent to a remaining phase, a line-to-line to line-to-neutral converter, comprising:

a first transformer, a second transformer, and a third transformer, each transformer having a primary winding and a secondary winding, and said primary winding of each transformer respectively connected between said adjacent phases of said three phase power source in a delta configuration, and one end of each said secondary winding of each transformer respectively connected together at a tie point to form a Y connection;

a first end of a first resistor (R1) (reference numerals refer to FIG. 3C) connected to a free end of a first said secondary winding, and a second end of said first resistor connected to a first end of a second resistor (R7), a first end of a third resistor (R4), and an output lead of said voltage proportional to said first phase relative to neutral, a second end of said second resistor (R7) connected to said tie point, and a second end of said third resistor (R4) connected to a free end of a second said secondary winding:

said free end of said second said secondary winding additionally connected to a first end of a fourth resistor (R2), and a second end of said fourth resistor (R2) connected to a first end of a fifth resistor (R8), a first end of a sixth resistor (R5), and an output lead for said voltage proportional to said second phase relative to neutral, a second end of said fifth resistor (R8) connected to said tie point, and a second end of said sixth resistor (R5) connected to a free end of a third said secondary winding:

said free end of said third said secondary winding additionally connected to a first end of a seventh resistor (R3), and a second end of said seventh resistor (R3) connected to a first end of an eighth resistor (R9), a first end of a ninth resistor (R6), and an output lead for said voltage proportional to said third phase relative to neutral, a second end of said eighth resistor (R9) connected to said tie point, and a second end of said ninth resistor (R6) connected to said first end of said first resistor (R1) and said free end of said first said secondary winding.

4,887,019

DEVICE FOR THE GENERATION OF A LASER BEAM SPOT OF ADJUSTABLE SIZE

Werner Reis, Munich, and Werner Bisle, Neuried, both of Fed. Rep. of Germany, assignors to G. Rodenstock Instruments GmbH, Munich, Fed. Rep. of Germany

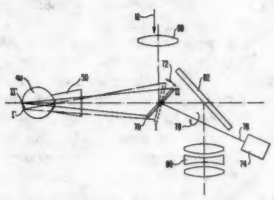
PCT No. PCT/DE86/00360, § 371 Date Jul. 13, 1987, § 102(e) Date Jul. 13, 1987, PCT Pub. No. WO87/01819, PCT Pub. Date Mar. 26, 1987

PCT Filed Sep. 11, 1986, Ser. No. 49,979

Claims priority, application Fed. Rep. of Germany, Sep. 11, 1985, 3532464; Mar. 12, 1986, 3608242

Int. Cl.[4] G02B *26/10*; A61B *3/10*

U.S. Cl. 350—6.1 **32 Claims**



1. A device for generating a circular laser beam spot of adjustable size in the human eye for laser treatment of the eye, comprising:

focusing means for imaging a laser beam to provide a small focusing spot with a large aperture angle on a portion of the eye;

deflector means for moving the focusing spot over a desired beam spot area of the eye in accordance with a predetermined scanning pattern so as to enable laser surgery of the eye with the circular laser beam spot of adjustable size and large aperture angle; and

control means for controlling the deposited energy of the laser beam over the scanned area of the laser beam spot to be substantially constant.

4,887,020

SELF-COMPENSATING BRUSHLESS ALTERNATOR

Gary R. Graham, Adelaide, Australia, assignor to U.S. Philips Corporation, New York, N.Y.

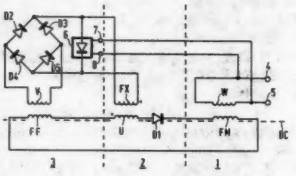
Continuation of Ser. No. 633,073, Jul. 23, 1984, abandoned, which is a continuation of Ser. No. 289,257, Aug. 3, 1981, abandoned. This application Oct. 27, 1987, Ser. No. 113,934

Int. Cl.[4] H02P *9/14*; H02K *21/04*

U.S. Cl. 322—63 **6 Claims**

1. A self-excited alternator of the brushless type, having a rotating field which is excited by an alternating current exciter whose rotating armature is mounted to rotate with the rotating field winding of the alternator and is permanently connected to the field winding of the alternator via field rectifier means also mounted to rotate with the field winding wherein the exciter has an exciter stator primary winding and a rotary exciter

secondary winding connected via rotary field rectifier means to the rotary main field winding of the alternator, primary excitation direct current for the exciter being derived, via magnetic coupling, from a rotary auxiliary magnetic field produced by a feedback primary winding connected in series with the main field winding and mounted to rotate therewith, and wherein a common magnetic circuit is used for coupling the feedback primary winding with a feedback secondary winding and for coupling the exciter primary and secondary windings, the common magnetic circuit comprising a common stator core on which the exciter primary winding and the auxiliary secondary winding are provided and a common rotor core on which the exciter secondary winding and the feedback winding are provided, the rotor core being so shaped and the feedback winding being so provided thereon that in operation



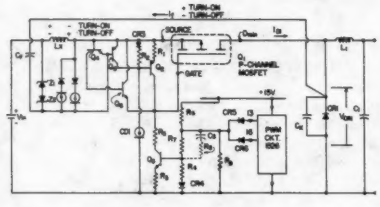
a pole group having either K or NK feedback pole pairs is formed with poles uniformly disposed around the rotor core and the stator core being so shaped and the exciter winding being so provided thereon that in operation a pole group having either NK or K exciter pole pairs are formed with poles uniformly disposed around the stator core, the ratio of feedback pole pairs to exciter pole pairs being either K to NK or NK to K, where K is any number and N is an even number, either the feedback winding or the exciter primary winding, as the case may be, for forming the pole group having K pole pairs comprising one or more first winding portions wound for generating the poles of that group whereby, with rotation of the rotor core relative to the stator core, the net change of magnetic flux linking with each first winding portion and due to the pole group having NK pole pairs is substantially zero.

4,887,021

PRECISION NOISE SPIKE ELIMINATION CIRCUIT FOR PULSE WIDTH MODULATORS AND PWM INVERTERS

Charles S. Walker, Seattle, Wash., assignor to Honeywell Inc., Minneapolis, Minn.

Filed Jan. 31, 1989, Ser. No. 304,074
Int. Cl.[4] G05F *1/565*
U.S. Cl. 323—279 **14 Claims**



1. A dual current source MOSFET turn-on/off circuit including precision noise spike elimination comprising:

a MOSFET connected between a voltage source and a load;

first current source connected to a gate electrode of said MOSFET;

second current source connected in series with said first current source;

control circuit means connected to said first current source for controlling the current supplied by said first current generator and thereby controlling the rate of change of drain current conducted by said MOSFET;

a diode connected across said load and a capacitor connected in parallel with said diode; and

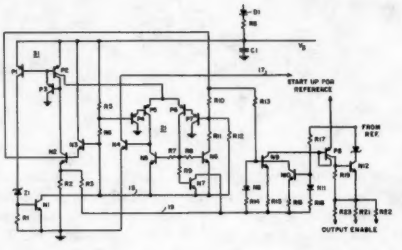
negative feedback means connected between said diode and said control circuit means for controlling the current supplied by said first current generator and thereby controlling the rate of change of the voltage across said diode.

4,887,022

UNDER VOLTAGE LOCKOUT CIRCUIT FOR SWITCHING MODE POWER SUPPLY

Walter S. Gontowski, Thompson, Conn., assignor to Cherry Semiconductor Corporation, East Greenwich, R.I.

Filed Jun. 1, 1989, Ser. No. 359,513
Int. Cl.[4] G05F *1/46*
U.S. Cl. 323—284 **10 Claims**



1. An under voltage lockout circuit for a power supply which, in operation, powers its own regulator circuitry, said circuit comprising;

means including a capacitor for temporarily providing starting current for the regulator circuitry;

a comparator having a first state in which the regulator is enabled and a second state in which the regulator is disabled and does not draw power, switching between states being controlled by a control voltage;

switch means for selectively connecting said comparator across said capacitor thereby to energize the comparator;

a voltage divider connected to said capacitor and operative when said comparator is energized for providing said control voltage thereto;

a voltage reference which conducts when the voltage applied reaches an essentially predetermined value, said reference being interconnected with said switch means to initiate energization of said comparator when conduction occurs in said reference; and

means for biasing said reference, the current flowing in said divider being applied to said biasing means when said comparator is disconnected whereby, until said reference conducts, essentially all current drawn from said capacitor is applied to said reference and said biasing means.

4,887,023

CAPACITIVE SENSOR AND CIRCUIT FOR DETECTING CONTAMINATION OF GUARD ELECTRODE

Christopher J. Gimson, Bolton, United Kingdom, assignor to Mestra A.G., Reinach, Switzerland

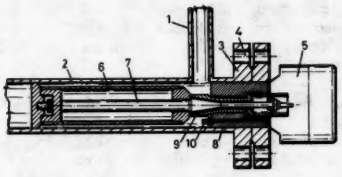
PCT No. PCT/GB87/00064, § 371 Date Sep. 12, 1988, § 102(e) Date Sep. 12, 1988, PCT Pub. No. WO87/04792, PCT Pub. Date Aug. 13, 1987

PCT Filed Jan. 30, 1987, Ser. No. 228,915

Claims priority, application United Kingdom, Feb. 4, 1986, 8602742

Int. Cl.[4] G01R *27/00*; G01N *27/00*

U.S. Cl. 324—61 R **2 Claims**



1. An apparatus for detecting contamination of a capacitive sensor, comprising a guard electrode surrounding a portion of the sensor, and a circuit for supplying an excitation signal to the sensor and an identical excitation signal to the guard electrode, wherein the circuit comprises means for periodically isolating the guard electrode from the excitation signal, and means for detecting the difference between the sensor output when the guard electrode is supplied with the excitation signal and when the guard electrode is isolated from the excitation signal, the detected difference being a function of the contamination of the guard electrode.

4,887,024

PERSON DETECTING DEVICE

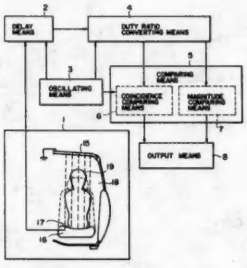
Masanori Sugiyama, Nishio; Takayoshi Masutani, and Takao Shirai, both of Toyota, all of Japan, assignors to Aisin Seiki Kabushiki Kaisha and Toyota Jidosha Kabushiki Kaisha, both of Aichi, Japan

Filed Oct. 27, 1988, Ser. No. 263,500

Claims priority, application Japan, Oct. 27, 1987, 62-271268

Int. Cl.[4] G01R *27/26*; G08B *21/00*

U.S. Cl. 324—61 R **20 Claims**



1. A person detecting device for detecting the presence and absence of a person comprising:

sensing means for sensing capacitance between at least a pair of electrodes facing to each other with a space, said capacitance varying depending upon the presence and absence of the person in said space;

oscillating means for providing a first pulse signal;

delay means for delaying said first pulse signal and providing a second pulse signal delayed in response to said capacitance of said sensing means;

duty ratio converting means for receiving said first and second pulse signal and providing a third pulse signal of a duty ration determined in response to said capacitance to convert said third pulse signal to a value representing said duty ratio; comparing means for comparing said value representing said duty ratio with at least a reference value preset for judging as to the presence and absence of the person to provide a resultant signal of comparison; and

output means for receiving said resultant signal of said comparing means and judging as to the presence and absence of the person to output a signal of the result of judgement;

wherein said oscillating means includes means for generating a clock pulse signal at a predetermined frequency and means for dividing said clock pulse signal into a plurality of divided pulse signals of different frequencies and providing one of said divided pulse signals as said first pulse signal, and wherein said duty ratio converting means includes means for converting said third pulse signal to a digital value corresponding to said duty ratio based on said clock pulse signal.

4,887,025

METHOD AND APPARATUS FOR THE NON-DESTRUCTIVE CHECKING OF SPOT WELDS BETWEEN METAL SHEETS PRODUCED BY ELECTRIC WELDING

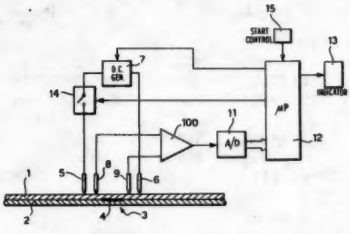
Stefano Re Fiorentin, Grugliasco, and Renzo Gaudenzi, Piossasco, both of Italy, assignors to Fiat Auto S.p.A., Turin, Italy

Filed Jan. 11, 1988, Ser. No. 141,754

Claims priority, application Italy, Jan. 9, 1987, 67011 A/87

Int. Cl.[4] G01R *27/14*

U.S. Cl. 324—65 R **7 Claims**



1. A method for the non-destructive checking of a spot weld between metal sheets, produced by electric welding, in which an electrical direct current of predetermined constant strength is passed through a spot weld by means of a first pair of electrodes and the electrical potential difference between two points on the surface of one of the sheets, respectively upstream and downstream of the spot weld along the path of the current, is measured by means of a second pair of electrodes,

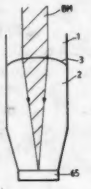
the second pair of electrodes being used to make at least one first measurement before the application of the direct current and at least one second measurement during the application of the direct current, the first and second measurements being carried out at two instants separated by a time interval equal to or a whole multiple of the period of the main power voltage used for electric welding, the difference between the values measured in the first and second measurements providing an indication of the quality of the spot weld.

4,887,026

VOLTAGE DETECTOR FOR DETECTING A VOLTAGE DEVELOPING IN A SELECTED AREA OF AN OBJECT

Hironori Takahashi; Yutaka Tsuchiya, and Shinichiro Aoshima, all of Shizuoka, Japan, assignors to Hamamatsu Photonics Kabushiki Kaisha, Shizuoka, Japan

Filed Jun. 3, 1988, Ser. No. 201,888
Claims priority, application Japan, Jun. 5, 1987, 62-142063
Int. Cl.[4] G01R *19/00, 19/155*
U.S. Cl. 324—96 **14 Claims**



1. A voltage detector for detecting a voltage developing in a selected area of an object to be measured, comprising:

a light source for emitting a light beam;

a voltage-sensing part including reflection means for reflecting an input light beam, and an electro-optic material for sensing said voltage in said object in the form of a change of a refractive index thereof and for converging said input light beam;

splitting and extracting means for extracting a light beam with a first predetermined polarized component from said light beam introduced from said light source which is launched into said electro-optic material as said input light beam, and extracting an output light beam with a second predetermined polarized component from an output light beam emerging from said electro-optic material after reflecting from said reflection means; and

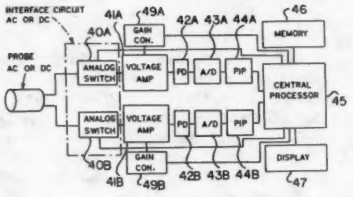
detection means for determining said voltage developing in said selected area of said object on the basis of intensity of said output light beam with said second predetermined polarized component.

4,887,027

LEADLESS CURRENT-SENSING SYSTEM

Gene W. Strasser, 2887 Walmsley Cir., Lake Orion, Mich. 48035

Filed Dec. 9, 1988, Ser. No. 282,037
Int. Cl.[4] G01R *33/06, 33/00*
U.S. Cl. 324—117 H **30 Claims**



18. A leadless current-sensing device for sensing DC current flowing in a current carrying conductor when said device is positioned in the vicinity of said current-carrying conductor comprising:

(a) a probe having a first Hall Effect plate having two intersecting current-sensing paths disposed at a preset radial angle alpha "α" in respect to each other;

(b) a pair of lead-out wires from each current-sensing path providing a voltage potential thereacross corresponding to the voltage induced in the respective current-sensing path by the magnetic field surrounding said current-carrying conductor;

(c) said probe also having a second Hall Effect plate having two intersecting current-sensing paths disposed at a preset radial angle alpha "α" in respect to each other;

(d) a pair of lead-out wires from each current-sensing path of said second Hall Effect plate providing a voltage potential thereacross corresponding to the voltage induced in the respective current-sensing path by the magnetic field surrounding said current-carrying conductor;

(e) said first Hall Effect plate having a sampling point corresponding to where the two current-sensing paths thereof intersect each other;

(f) said sampling point of said first Hall Effect plate being capable of sampling distinct voltage potentials induced in the two current-sensing paths of said first Hall Effect plate;

(g) said second Hall Effect plate having a sampling point corresponding to where the two current-sensing paths thereof intersect each other;

(h) said sampling point of said second Hall Effect plate being capable of sampling distinct voltage potentials induced in the two current-sensing paths of said second Hall Effect plate;

(i) the first and second Hall Effect plates being disposed at a preset radial angle delta "δ" in respect to each other;

(j) the first and second Hall Effect plates being disposed at a preset axial distance "z" in respect to each other; and

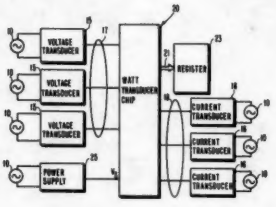
(k) means including a voltage processing circuit for comparing to each other two voltage potentials from either Hall Effect plate to calculate the orientation angle (theta "θ") that each respective current-sensing path makes with the current-carrying conductor.

4,887,028

WATTHOUR METER WITH ISOLATION TRANSFORMERS HAVING A FEEDBACK LOOP

John T. Voisine, Lafayette, Ind., and Andy Joder, Unteraegeri, Switzerland, assignors to Landis & Gyr Metering, Inc., Lafayette, Ind.

Filed Sep. 21, 1987, Ser. No. 99,257
Int. Cl.[4] G01R *21/00, 15/02;* **H01F** *27/42*
U.S. Cl. 324—142 **12 Claims**



1. An electronic watthour meter for measuring AC power consumption comprising:

a current transducer for producing a current signal corresponding to the AC load current;

voltage sensing means for producing a voltage signal corresponding to the Ac line voltage, said voltage sensing means including a current transformer having a primary coil connected in series with a resistance and a secondary coil;

measurement circuit means having inputs receiving the voltage signal and the current signal for multiplying said voltage signal and said current signal; and

active phase adjusting circuit means for adjusting the phase of one of said signals input to said measurement circuit means to cause the product of the current signal and the

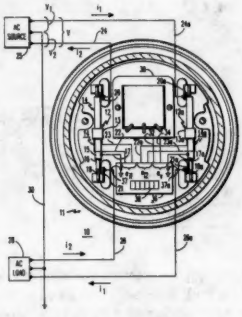
voltage signal to represent the actual AC power consumption.

4,887,029

MUTUAL INDUCTANCE CURRENT TRANSDUCER, METHOD OF MAKING AND ELECTRIC ENERGY METER INCORPORATING SAME

Rodney C. Hemminger, Raleigh, N.C., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Mar. 18, 1988, Ser. No. 170,173
Int. Cl.[4] G01R *11/48, 11/20*
U.S. Cl. 324—142 14 Claims



1. A mutual inductance differential current transducer for producing an analog voltage output signal in response to, and having a level varying linearly with respect to, the magnitude and rate of change of a flow of current supplied by an alternating current power line distribution system, comprising:

an elongated current conductor having first and second ends and a substantially straight axial portion therebetween of a predetermined length and defining a central axis;

a generally cylindrical sleeve of conductive material of substantially the predetermined length, received coaxially over the elongated current conductor in the straight axial portion thereof and electrically insulated therefrom;

a toroidal sensor coil defining a central axis and having an axial length less than approximately one-third the length of the generally cylindrical sleeve and an internal diameter substantially the same as the outer diameter of the cylindrical sleeve and sufficient to position the coil coaxially on the cylindrical sleeve, the coil being positioned coaxially thereon and generally centrally of the length thereof;

the toroidal coil having a rectangular cross-section in a plane extending radially from and including the central axis of the coil, each longer leg of the rectangular cross-section, corresponding to the axial length of the coil, being parallel to the central axis of the current conductor and each shorter leg being transverse to the central axis and defining the outer diameter of the coil relatively to the inner diameter thereof, the toroidal coil being inductively coupled and thereby responsive to magnetic flux variations produced by an alternating current flow through the current conductor for producing an analog voltage signal output which is substantially linearly responsive to the time derivative of the current flow in the current conductor throughout a ratio of current flow variations therethrough of at least 400 to 1, and the coil comprising a number of turns determined in accordance with producing the substantially lineary responsive analog voltage signal output at levels extending through a predetermined voltage range, the turns being provided in an integer number of layers, each layer comprising a common number of turns and the turns of each layer being substantially uniformly distributed about the circumferential length of the toroidal coil and having pseudo-perfect symmetry; and

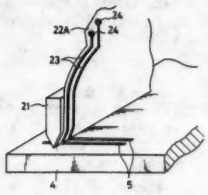
the toroidal coil further including a compensating turn of wire for each layer of turns, each compensating turn extending throughout the circumferential length of the coil at a position intermediate the inner and outer diameters thereof.

4,887,030

TESTING DEVICE FOR ELECTRICAL CIRCUIT BOARDS

Kenichi Niki; Tohru Kokogawa; Akira Ishizu, and Hayato Takasago, all of Amagasaki, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Nov. 6, 1987, Ser. No. 117,616
Claims priority, application Japan, Dec. 12, 1986, 61-297073
Int. Cl.[4] G01R *31/22, 1/06*
U.S. Cl. 324—158 P 2 Claims



1. A testing device for testing an electric circuit board having test terminals thereon parallel to each other, the testing device comprising:

a resilient wedge shaped pressing member having first and second opposite facing planar sides, and a pressing edge formed at the tapered termination of said first and second opposite planar sides of said pressing member,

a flexible, insulative base sheet including a first face region having conductor strips etched thereon in a pattern corresponding to the test terminals on said electric circuit board, said first face region being in contact with said pressing edge of said pressing member for effecting contact between said conductor strips on said first face region and said test terminals, said flexible sheet having second and third face regions in contact with said first and second planar sides, respectively, of said pressing member, said first face region being located between said second and third face regions, said conductor strips extending to outer peripheral edges on said second and third face regions of said base sheet, and wherein spacing between adjacent conductor strips in said second and third face regions of said base sheet is at least twice as large as the spacing between adjacent conductor strips in said first face region of said base sheet.

4,887,031

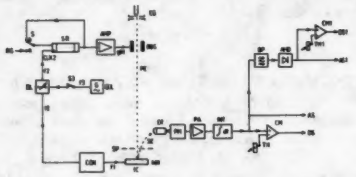
METHOD AND APPARATUS FOR DETECTING AND IMAGING MEASURING POINTS THAT HAVE A DEFINED SIGNAL PROGRESSION

Hans-Detlef Brust, Dudweiler, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Division of Ser. No. 760,574, Jul. 30, 1985, Pat. No. 4,771,235.
This application Apr. 1, 1988, Ser. No. 176,455
Claims priority, application Fed. Rep. of Germany, Aug. 6, 1984, 3428965
Int. Cl.[4] G01R *31/02;* G01N *23/00*
U.S. Cl. 324—158 R 14 Claims

1. A method for detecting and/or imaging measuring points which have a defined signal progression with the assistance of a particle microscope comprising, the steps of bombarding the

measuring point with primary particles (PE), which cause secondary particles (SE) to be emitted at the measuring point, detecting with a detector (DT) said secondary particles and producing a secondary particle signal, processing said signal to



a measured particle signal, comparing the progression of the measured particle signal with the anticipated reference signal progression (RS) and producing an output signal in which the degree of coincidence of said signals defines an output signal (AS, DS, AS1, DS1).

4,887,032

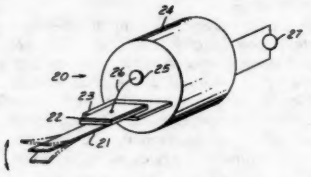
RESONANT VIBRATING STRUCTURE WITH ELECTRICALLY DRIVEN WIRE COIL AND VIBRATION SENSOR

Robert E. Hetrick, Dearborn Heights, Mich., assignor to Ford Motor Company, Dearborn, Mich.

Filed May 2, 1988, Ser. No. 188,883

Int. Cl.[4] G01B *7/14;* **G01R** *33/02, 33/00*

U.S. Cl. 324—207 **13 Claims**



1. A resonance vibrating structure including:

an adjacent external magnet;

wire coil means coupled to said vibrating structure;

electrical power supply means coupled to said coil means to pass electric current through said coil means at the resonance vibrational frequency of said structure;

said wire coil means being positioned on said structure so that when current having the resonance vibrational frequency is passed through said coil means in the presence of said external magnet, an electromagnetic force is exerted on said structure which causes said structure to vibrate at its resonance frequency;

a vibration sensing means positioned on the structure so that the vibration of said structure causes an electrically measurable output from said vibration sensing means proportional to the vibrational amplitude;

said coil means being appropriately sized and positioned with respect to said magnet so that the vibration induced output from said vibration sensing means varies in a predetermined desired manner as the magnetic field is perturbed so that the output can serve as a sensor of relative position between an object perturbing the magnetic field and said coil means;

feedback means coupled to said electrical power supply means and to said vibration sensing means for feedback control, said feedback means providing an output which controls the current through said coil means for exciting the vibration and keeping said resonance vibrating structure vibrating at its resonance frequency even though the resonance frequency may be changing with external ambient conditions such as temperature.

4,887,033

MAGNETOMETER HAVING COIL FORMED BY TWO SPIRAL SHAPED CONDUCTORS

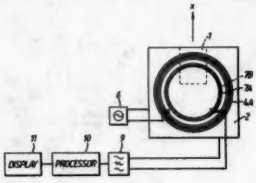
Roger M. Langdon, Colchester, and Cyril Smith, Alton, both of United Kingdom, assignors to General Motors Corporation, Detroit, Mich.

Filed Mar. 3, 1988, Ser. No. 163,577

Claims priority, application United Kingdom, Mar. 6, 1987, 8705247

Int. Cl.[4] G01R *33/04;* **G01C** *17/28*

U.S. Cl. 324—253 **8 Claims**



1. A fluxgate magnetometer comprising a body of magnetic material, a drive coil, a sensing coil, and a pair of substrates spaced apart a predetermined distance and disposed on opposite sides of said body of magnetic material, each of said substrates being electrically insulating; one of said drive coil and said sensing coil being composed of two portions, each of said two portions being respectively disposed on and supported by one of said substrates in respective planes which are generally parallel and in spaced relationship, each of said two portions including an electrically conductive spiral shaped portion, the other one of said drive coil and said sensing coil being supported by at least one of said substrates, and said two portions being electrically connected together such that electric current flows in the respective said spiral shaped portions in opposite rotational senses.

4,887,034

METHODS AND APPARATUS FOR DETECTING CERTAIN COMPOUNDS

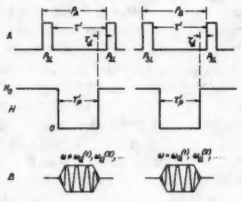
John A. S. Smith, London, England, assignor to National Research Development Corporation, London, England

Filed Jan. 26, 1988, Ser. No. 148,704

Claims priority, application United Kingdom, Jan. 27, 1987, 8701695

Int. Cl.[4] G01R *33/20*

U.S. Cl. 324—307 **18 Claims**



1. A method of detecting the presence of one or more compounds containing both nuclei of a first kind which exhibit nmr and nuclei of a second kind which exhibit nqr comprising subjecting material suspected of containig such a compound to a magnetic field and successively and repetitively to two types

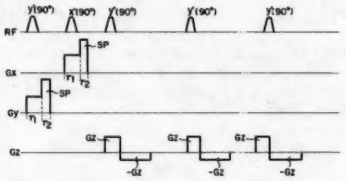
of sequence, each sequence comprising an rf pulse or pulse train at the nmr frequency of the first kind of nucleus in the said magnetic field followed by a time interval in which in at least one of the sequences there is a predetermined change in the magnitude of the said magnetic field, and during the time interval in at least one of the types of sequence applying rf signals at one or more frequencies selected so that in combination with the aforesaid change in the magnitude of the magnetic field the subsequent nmr signal is modified if such a compound is present, and measuring the difference in the magnitude of the nmr signals obtained following the two types of sequence.

4,887,035

MAGNETIC RESONANCE SPECTROSCOPY SYSTEM

Masatoshi Hanawa, Ootawara, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Jul. 13, 1988, Ser. No. 218,277
Claims priority, application Japan, Jul. 15, 1987, 62-176835
Int. Cl.[4] G01R *33/20*
U.S. Cl. 324—309 **9 Claims**



1. A magnetic resonance spectroscopy system comprising:
static magnetic field applying means for applying a static magnetic field to an object under examination;
gradient magnetic field applying means for applying gradient magnetic fields to the object;
high frequency pulse applying means for applying a high frequency pulse including a 90° pulse to the object;
detecting means for detecting a magnetic resonance signal from the object;
control means for causing said static magnetic field applying means, said gradient magnetic field applying means, and said high frequency pulse applying means to operate in a predetermined sequence so as to induce magnetic resonance within the object; and
data processing means for processing data based on the magnetic resonance signal detected by said detecting means to obtain magnetic resonance spectrum information;
said control means including local excitation control means for repeatedly performing operations of: selectively exciting, using a first gradient magnetic field and a 90° pulse, first two regions which sandwich a desired local region therebetween in a first-axis direction for a predetermined slice portion; subsequently erasing transverse magnetization components in said first two regions; selectively exciting, using a second gradient magnetic field and a 90° pulse, second two regions which sandwich said desired local region therebetween in a second-axis direction normal to the first-axis direction for said slice portion; subsequently erasing transverse magnetization components in said second two regions; and sequentially exciting at least two regions having local regions aligned in a third-axis direction intersecting said slice to acquire magnetic resonance data therefor, repeatedly using a third gradient magnetic field and a high frequency pulse within a repetition time of the excitation of said desired local region;
said data processing means obtaining a magnetic resonance spectrum of said local regions on the basis of magnetic resonance data acquired in the operations carried out by said local excitation control means.

4,887,036

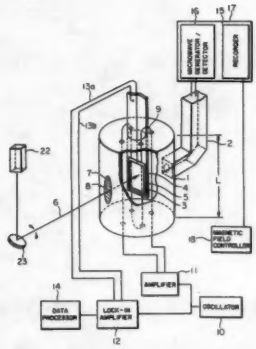
Patent Not Issued For This Number

4,887,037

ELECTRON SPIN RESONANCE SPECTROMETER

Yusuke Yajima, Kokubunji, and Kanji Tsujii, Tokyo, both of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Feb. 8, 1988, Ser. No. 153,092
Claims priority, application Japan, Mar. 20, 1987, 62-63776
Int. Cl.[4] G01R *33/20*
U.S. Cl. 324—316 **19 Claims**



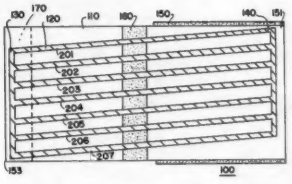
1. An electron spin resonance spectrometer comprising:
magnetic field generating means for applying a magnetic field to a sample;
microwave supply means for supplying a microwave to the sample;
illumination means for illuminating the sample with light; and
photo-induced voltage detecting means for detecting a photo-induced voltage appearing across the sample.

4,887,038

SOLENOIDAL SURFACE COILS FOR MAGNETIC RESONANCE IMAGING

Jan Votruba, Port Jefferson, and George R. Morris, Bay Shore, both of N.Y., assignors to Fonar Corporation, Melville, N.Y.

Continuation-in-part of Ser. No. 125,331, Nov. 25, 1987, abandoned. This application Oct. 13, 1988, Ser. No. 257,399
Int. Cl.[4] G01R *33/20*
U.S. Cl. 324—318 **18 Claims**



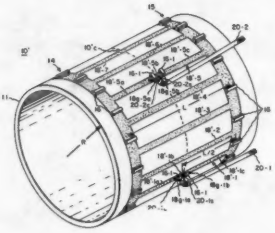
1. A receiver antenna for an NMR imaging system, said receiver antenna comprising, an elongated, belt-like carrier member, said carrier member having a first end and a second end spaced apart from one another in a longitudinal dimension and a first side and a second side defining a lateral width, at least two electrical conductors connected in parallel, said at least two conductors being spacedly positioned across said lateral width in side-by-side relation and carried on said belt-like carrier member in the longitudinal direction thereof, said carrier member with said at least two electrical conductors being adapted to form a loop about a specimen.

4,887,039

METHOD FOR PROVIDING MULTIPLE COAXIAL CABLE CONNECTIONS TO A RADIO-FREQUENCY ANTENNA WITHOUT BALUNS

Peter B. Roemer; William A. Edelstein, both of Schenectady, N.Y.; Cecil E. Hayes, Wauwatosa, and Matthew G. Eash, Oconomowoc, both of Wis., assignors to General Electric Company, Schenectady, N.Y.

Filed Dec. 22, 1988, Ser. No. 288,668
Int. Cl.[4] G01R *33/20*
U.S. Cl. 324—322 20 Claims



15. A radio-frequency (RF) antenna, comprising:

an RF coil having a pair of opposed conductive end rings, each separated into a first plurality of segments, and a plurality of axial conductors, each extending between like positioned segments of the end rings; and

a plurality of coaxial cables, each having a shield conductor connected to a selected one of a common potential point, a common potential line and a common potential surface upon the coil, and each having a center conductor directly connected to a different location upon the RF coil.

4,887,040

DEVICE FOR MEASURING THE IMPEDANCE OF A MEDIUM ALONG A MEASUREMENT LINE

Charles N. Murray, Ispra, Italy, and Thomas R. Fortescue, Bridport, United Kingdom, assignors to Europaische Atomgemeinschaft (EURATOM), Luxembourg

Filed Feb. 3, 1989, Ser. No. 305,593
Claims priority, application Luxembourg, Feb. 3, 1988, 87124
Int. Cl.[4] G01N *27/02, 27/07;* G01R *27/14*
U.S. Cl. 324—446 2 Claims

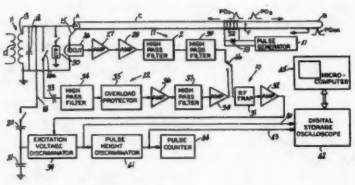
1. A device for measuring the impedance of a medium along a measurement line, the medium being either sea water or a sediment on the sea-bottom or else a mixture thereof, the device comprising an antenna extending along the measurement line, an electric signal generator feeding said antenna and a meter circuit for measuring the antenna impedance, the antenna consisting of a central core, a plurality of electric wires wound around the core, an insulating layer surrounding said electric wires and a series of electrically conducting even and odd numbered braid sections of limited length, which are disposed around this insulating layer and arranged one after the other in regular length portions, each even-numbered braid section being connected to one of the wires respectively, whereas all odd-numbered braid sections are connected in common to a common wire, the generator and the meter circuit being connected to a programmable mulitplex switch which is able to cyclically connect the generator and the meter circuit to any two wires connected to the even-numbered braid portions, whereas the odd-numbered braid portions are permanently grounded via said common wire.

4,887,041

METHOD AND INSTRUMENTATION FOR THE DETECTION, LOCATION AND CHARACTERIZATION OF PARTIAL DISCHARGES AND FAULTS IN ELECTRIC POWER CABLES

Matthew S. Mashikian, Storrs; Robert B. Northop, Chaplin; Rajeev Bansal, Willington, all of Conn., and Chrysostomos L. Nikias, Needham, Mass., assignors to University of Connecticut, Storrs, Conn.

Continuation-in-part of Ser. No. 157,416, Feb. 17, 1988. This application Jul. 7, 1988, Ser. No. 216,132
Int. Cl.[4] G01R *31/08*
U.S. Cl. 324—533 30 Claims



1. A method of detecting the locations of incipient faults in an insulated power line comprising the steps of:

applying an excitation voltage to one end of said line at an excitation point,

detecting a first high frequency pulse produced by a discharge in said line and transmitted on said line to the excitation point,

detecting a first reflection of said pulse from the other end of said line, to the point of excitation,

detecting the travel time of a reflection of said first pulse from said excitation point to said other end and return to said excitation point, and

dividing the time between the detection of said first pulse and said first reflected pulse by said detected travel time.

4,887,042

HIGH SPEED MULTI-CHANNEL PHASE DETECTOR

Christopher R. Keate, and Jeffrey Mac Thornock, both of Unisys Corp., Law Dept., P.O. Box 500, Blue Bell, Pa. 19424

Filed Jul. 22, 1988, Ser. No. 222,700
Int. Cl.[4] H03K *9/06;* H03L *7/00*
U.S. Cl. 328—133 7 Claims

1. A high speed multi-channel phase detector circuit, comprising:

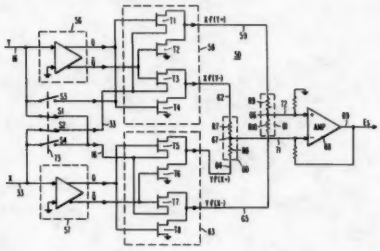
a phase channel for each analog data input,

each said phase channel comprising comparator means and electronic switching means,

each said comparator means having a logic high and a logic low binary output,

each said electronic switching means being coupled to the logic outputs of one of said comparator means for producing a positive function value output or a negative function value output depending on the coupled logic inputs,

summing means comprising a positive summing circuit and a negative summing circuit coupled to the value outputs of



said electronic switching means for producing a product of the outputs of said switching means , and

a differential amplifier having a positive input connected to said positive summing circuit and negative input connected to said negative summing circuit for eliminating all complex data modulation signals from the outputs of said summing circuits and providing a phase detector error voltage signal.

4,887,043

PHASE SHIFTER-EQUALIZER CIRCUIT

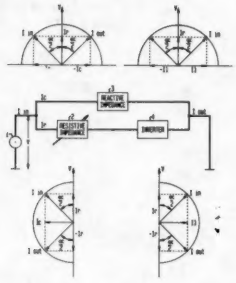
Termano Testi, Monza, and Gabriele Merli, Cassano D'Adda, both of Italy, assignors to GTE Telecomunicazioni, S.p.A., Cassina de Pecchi, Italy

Filed Nov. 6, 1986, Ser. No. 927,483

Claims priority, application Italy, Nov. 15, 1985, 22867 A/85

Int. Cl.[4] H03H *5/00*; H03K *5/13*

U.S. Cl. 328—155 **9 Claims**



1. Constant complitude phase-shifter equalizer circuit including an input terminal, coupled to an input node, and fed by an input current signal generator and an output node coupled to an output terminal, said circuit introducing a phase variation and a group delay between the input current signal and a current signal at the output terminal, and comprising:

a first branch, coupled between said input and output nodes, including a series connection of a phase inverter device and a first impedance; and

a second branch coupled between said input and output nodes, including a second impedance, wherein:

said first impedance is an adjustable impedance for permitting continuous adjustment of the phase variation and group delay between current signals at said input and output terminals, is serially connected and is purely reactive, while the said second impedance is purely resistive.

4,887,044

PULSE COUNTER TYPE DEMODULATOR

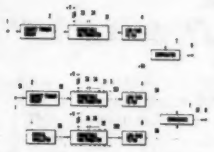
Taketoshi Inoue, Tokyo, Japan, assignor to NEC Corporation, Japan

Filed Jan. 27, 1988, Ser. No. 148,962

Claims priority, application Japan, Jan. 30, 1987, 62-20303

Int. Cl.[4] H03D *3/00*; H04L *27/14*

U.S. Cl. 329—300 **8 Claims**



8. A method of demodulating an input signal to provide a demodulated signal, comprising the steps of:

converting said input signal to a first pulse position modulated (PPM) signal;

generating an oscillator signal;

converting said oscillator signal to a signal of a pulse train having a constant pulse separation, said steps of converting said input signal and of converting said oscilllation signal being performed on the same chip;

filtering said first PPM signal and said signal of a pulse train having a constant pulse separation to provide first and second filtered signals, respectively; and

comparing said first and second flitered signals to provide said demodulated signal.

4,887,045

SUM/DIFFERENTIAL SIGNAL PROCESSING CIRCUIT

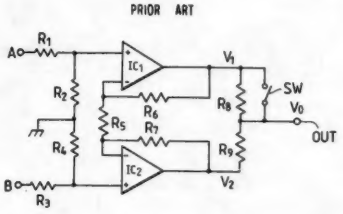
Kazuaki Nakayama, Tokyo, Japan, assignor to Pioneer Electronic Corporation, Tokyo, Japan

Filed Mar. 30, 1989, Ser. No. 330,526

Claims priority, application Japan, Sep. 7, 1988, 63-118059[U]

Int. Cl.[4] H03F *3/45*

U.S. Cl. 330—69 **3 Claims**



1. A sum/differential signal processing circuit for receiving first and second input signals and producing a sum signal and a differential signal upon processing said first and second input signals, said circuit comprising:

first and second operational amplifiers, each having an inverting input terminal, a noninverting input terminal and an output terminal;

first and second signal input terminals, said first and second input signals being applied to said first and second signal input terminals, respectively;

an attenuator having one end connected to said first and secnd signal input terminals and another end connected to said noninverting input terminals of said first and second operational amplifiers for attenuating said first and second input signals when applying to said noninverting input terminals thereof, wherein said first and second operational amplifiers output first and second output signals in response to said attenuated first and second input signals, respectively;

a first resistor connected between said inverting input terminals;

second and third resistors connected in series to each other at a junction, said series-connected resistors being connected across said output terinals of said first and second operational amplifiers;

fourth resistor connected between said output terminal of said first operational amplifier and said inverting input terminal thereof;

fifth resistor connected between said output terminal of said second operational amplifier and said inverting input terminal thereof;

a signal output terminal connected to said junction;

a switch connected across said second resistor; said switch being selectively rendered ON and OFF, said second resistor being short-circuited when said switch is ON; and

wherein said sum signal is indicative of a sum of said first and second outputs and said differential signal is indicative of a difference between said first and second outputs, said sum signal appears on said signal output terminal when said switch is OFF and said differential signal appears thereon when said switch is ON, and wherein resistances of said first, second, third, fourth and fifth resistors are selected so that said sum signal and said differential signal are provided on said signal output terminal.

4,887,046

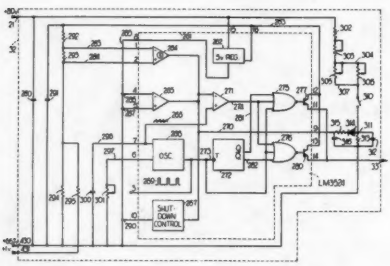
APPARATUS FOR LINEARIZING THE OUTPUT OF AN AMPLIFIER WITHOUT USING FEEDBACK

Malcolm T. Gilliland, 310 Pine Valley Rd., Marietta, Ga. 30067

Division of Ser. No. 791,224, Oct. 25, 1985, Pat. No. 4,716,274. This application Nov. 9, 1987, Ser. No. 118,613

Int. Cl.[4] H03F 3/45

U.S. Cl. 330—252 **7 Claims**



1. A high gain, linear, open loop amplifier, comprising:

a voltage divider connected to an input signal, said voltage divider having a first output terminal and a second output terminal, the impedance between said first output terminal and said second output terminal being a small fraction of the total impedance of said voltage divider; and

a high gain, linear differential amplifier having a first differential input connected to said first output terminal and a second differential input connected to said second output terminal;

wherein said voltage divider comprises a first resistor and a second resistor connected in series, said first output terminal and said second output terminal being connected to a first end and a second end, respectively, of a selected one of said first resistor and said second resistor, the resistance of said selected one of said resistors being significantly smaller than the resistance of the other said resistor.

4,887,047

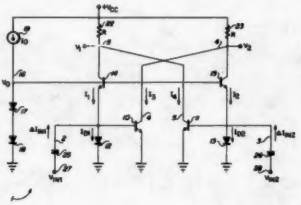
CURRENT SENSE AMPLIFIER WITH LOW, NONLINEAR INPUT IMPEDANCE AND HIGH DEGREE OF SIGNAL AMPLIFICATION LINEARITY

Thomas A. Somerville, Tucson, Ariz., assignor to Burr-Brown Corporation, Tucson, Ariz.

Filed Sep. 30, 1988, Ser. No. 252,394

Int. Cl.[4] H03F 3/45

U.S. Cl. 330—257 **13 Claims**



10. A current sense amplifier comprising in combination:

(a) first and second transistors;

(b) first and second current mirror circuits having output conductors cross-coupled to collectors of the first and second transistors, respectively;

(c) means for applying a bias voltage to bases of the first and second transistors;

(d) first and second load devices connected to the collectors of the first and second transistors, respectively;

(e) means for coupling emitters of the first and second transistors to control inputs of the second and first current mirror circuits, respectively.

4,887,048

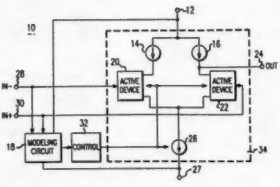
DIFFERENTIAL AMPLIFIER HAVING EXTENDED COMMON MODE INPUT VOLTAGE RANGE

William R. Krenik, Dallas; Wei-chan Hsu, Plano, and Richard Nail, Dallas, all of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Filed Jan. 21, 1988, Ser. No. 146,441

Int. Cl.[4] H03F 3/45

U.S. Cl. 330—258 **33 Claims**



1. A differential amplifier circuit comprising:

first and second current supply means configured so that current flowing through said first current supply means is proportional to current flowing through said second current supply means; a first active device having first and second nodes and having a control node, said first active device first node being coupled to said first current supply means; a second active device having first and second nodes and having a control node, said second active device first node being coupled to said second current supply means, and said first active device second node being coupled to said second active device second node;

modeling means, coupled to said first active device control node, for simulating current flowing through said first active device; and

means coupled to said modeling means and at least one of

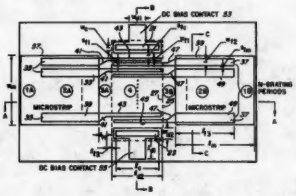
said first and second active devices responsive to the simulated current through said modeling means for maintaining substantially constant currents flowing through said first and second current supply means.

4,887,049

SOLID STATE SPACE HARMONIC AMPLIFIER

Clifford M. Krowne, Alexandria, Va., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Mar. 1, 1988, Ser. No. 162,701
Int. Cl.[4] H03F *3/60*
U.S. Cl. 330—286 **4 Claims**



1. A semiconductor device comprising:

input means for receiving an input RF electromagnetic wave;

means for enabling an electron, stream to flow through the semiconductor device;

interaction circuit means displaced from said enabling means in a first direction, said interaction circuit means being responsive to said electromagnetic wave from said input means for allowing an interaction between said electromagnetic wave and said electron stream to amplify said electromagnetic wave; and

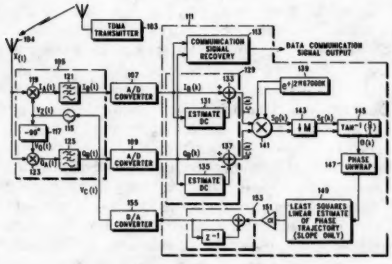
output means for coupling the amplified electromagnetic wave out of said interaction circuit means.

4,887,050

FREQUENCY CONTROL APPARATUS AND METHOD FOR A DIGITAL RADIO RECEIVER

David E. Borth, Palatine, and James F. Kepler, Northbrook, both of Ill., assignors to Motorola, Inc., Schaumburg, Ill.

Filed Mar. 31, 1989, Ser. No. 331,557
Int. Cl.[4] H03L *7/00*
U.S. Cl. 331—34 **43 Claims**



1. A frequency control apparatus for a burst-mode radio communications system employing a frequency correction signal transmitted as a burst to enable correction of frequency differences between the frequency of the radio carrier of a subsequent communication bursgt and the frequency of reception by a radio receiver, the frequency control apparatus comprising:

means, including a variable frequency oscillator, for receiving a frequency correction signal burst and for processing a communication burst having a frequency difference between said variable frequency oscillator and the radio carrier frequency of said communication burst; and

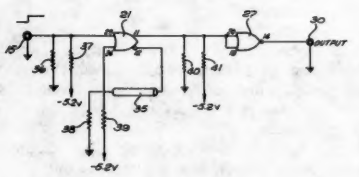
means, coupled to said means for receiving said frequency correction signal burst, for generating a singular control signal value and for applying said singular control signal value to said variable frequency oscillator to correct said frequency difference.

4,887,051

LOW PHASE JITTER OSCILLATOR

Samuel McCutcheon, Coronado, Calif., assignor to Autek Systems Corporation, San Jose, Calif.

Filed Jan. 23, 1989, Ser. No. 299,398
Int. Cl.[4] H03B *1/00*
U.S. Cl. 331—69 **16 Claims**



1. A low phase jitter, adjustable oscillator wherein the delay between a trigger signal and an output oscillating signal generated therefrom is minimal, said oscillating signal oscillating between two states, said oscillator comprising:

a gate input signal which acts as a trigger signal by changing from a first state to a second state;

an OR-gate means, said OR-gate comprising an output pin, inverted output pin and first and second input pins, said OR-gate means outputting through the output pin and output signal which is the result of a logical OR function of the signals input to the first and second input pins and said OR-gate means outputting through the inverted output pin an inverted output signal which is the inverse of the signal output through the output pin, said gate input signal being connected to the first input pin and causing the output signal and inverted output signal to change state to initiate the output oscillating signal upon receipt of the trigger signal;

a feedback loop means which connects said inverted output pin to the second input pin of the OR-gate, said feedback loop means being adjustable in length, wherein the inverted output signal is input to the OR-gate after a delay equal to the propagation delay through the feedback loop, causing the output signal and the inverted output signal to change state;

wherein the output signal oscillates between states at a frequency equal to:

where Pdg is the propagation dealy of the OR-gate and Pdfl is the propagation delay of the feedback loop means, the propagation dealy of the feedback loop means being adjustable to varying lengths thereby modifying the propagation delay of the feedback loop means and the frequency of the oscillating output signal.

4,887,052

TUNED OSCILLATOR UTILIZING THIN FILM FERROMAGNETIC RESONATOR

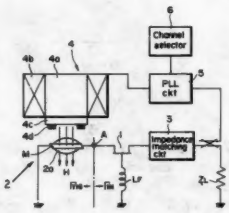
Yoshikazu Murakami; Yasuyuki Mizunuma; Takahiro Ohgihara, all of Kanagawa; Hiroyuki Nakano, Tokyo; Kanako Niikura, and Tsutomu Okamoto, both of Kanagawa, all of Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Nov. 25, 1988, Ser. No. 276,146

Claims priority, application Japan, Nov. 27, 1987, 62-299383; Nov. 27, 1987, 62-299384

Int. Cl.[4] H03B *5/04, 5/18;* H03L *1/02, 7/16*

U.S. Cl. 331—96 4 Claims



1. A tuned oscillator utilizing a thin film ferromagnetic resonator comprising;

an active element for oscillation,

a tin film ferromagnetic resonance element formed of a thin film ferromagnetic plate and a transmission line coupled to said thin film ferromagnetic plate and connected to said active element as a part of a feed back circuit for said active element,

bias magnetic field means applying a bias magnetic field perpendicular to said thin film ferromagnetic plate, and

a PLL (phase lock loop) circuit receiving an oscillation output and generating a control signal to stabilize the oscillation,

said bias magnetic field means being formed of a permanent magnet which generates a fixed bias magnetic field component and a coil which generates a variable bias magnetic field component, said coil being fed with a current which is controlled by said control signal which is obtained from said PLL circuit.

4,887,053

HIGH FREQUENCY VLSI OSCILLATOR

David M. Embree, Hampstead, N.H., and Shawn M. Logan, Andover, Mass., assignors to American Telephone and Telegraph Company, New York, N.Y. and AT&T Bell Laboratories, Murray Hill, N.J.

Continuation-in-part of Ser. No. 126,131, Nov. 27, 1987. This application Nov. 7, 1988, Ser. No. 266,686

Int. Cl.[4] H03B *5/36*

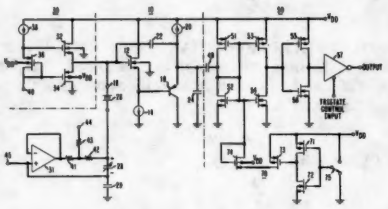
U.S. Cl. 331—116 FE 7 Claims

1. An electronic oscillator comprising;

a first amplifying stage having an MOS transistor connected in source follower configuration;

a second amplifying stage having a bipolar transistor of opposite polarity from said MOS transistor connected to said first amplifying stage; and

feedback means connected between the output of said second stage and the input of said first stage;



the transconductance of said bipolar transistor being substantially greater than that of said MOS transistor.

4,887,054

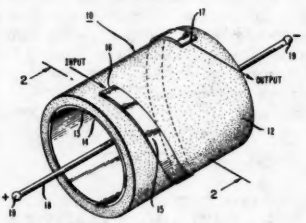
COMPACT MICROSTRIP LATCHING RECIPROCAL PHASE SHIFTER

Richard A. Stern, Allenwood, and Richard W. Babbitt, Fair Haven, both of N.J., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Dec. 23, 1988, Ser. No. 290,719

Int. Cl.[4] H01P *1/195*

U.S. Cl. 333—158 4 Claims



1. A compact microstrip latching reciprocal phase shifter comprising

a toroidal-shaped ferrite core having

a cylindrical outer surface, and

a cylindrical inner surface defining the aperture of the toroidal-shaped core;

an electrically conductive cylindrical ground plane mounted on and concentric with said inner surface of said toroidal-shaped core;

a length of electrically conductive microstrip conductor mounted on said outer surface of said toroidal-shaped core and extending around at least a portion of the circumference of said core outer surface; and

selectively operable control current pulse responsive control wire means disposed in and extending through said aperture in said toroidal-shaped core for latching said core into either a first saturated magnetic state in which a circular unidirectional magnetic field is created in said core surrounding said aperture in said core or a second non-saturated magnetic state in which a circular unidirectional magnetic field is created in said core surrounding said aperture in said core, whereby said core exhibits a different insertion phase in each of said first and second magnetic states with respect to electromagnetic wave energy propagated through said core from one end of said length

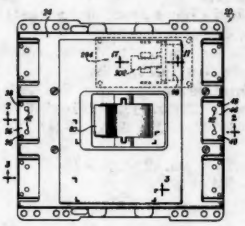
of microstrip conductor to the other end of said length of microstrip conductor.

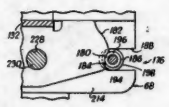
4,887,055

MODULAR OPTION DECK ASSEMBLY

Andrew J. Male, Export, Pa., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Aug. 1, 1988, Ser. No. 226,654
Int. Cl.[4] H01H *75/00, 73/12, 83/00*
U.S. Cl. 335—6 **8 Claims**





1. A circuit breaker comprising:
a housing having a base portion and a cover portion;
one or more pairs of separable contacts disposed in said base portion;
an operating mechanism including a trip bar for actuating said separable contacts;
a modular option deck disposed adjacent said trip bar having an aperture for allowing communication with said trip bar;
a bracket with depending arms for carrying an option;
one or more options each with an extending actuation lever; and
a plurality of sets of slots integrally formed in said deck for slidingly receiving said arms in said bracket and allowing said extending actuation levers to communicate with said trip bar.

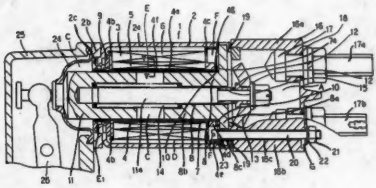
4,887,056

MAGNET SWITCH FOR A STARTER

Sadayosi Kajino, Nagoya, and Atsuomi Iida, Chiryu, both of Japan, assignors to Nippondenso Co., Ltd., Kariya, Japan

Filed Mar. 2, 1988, Ser. No. 163,099
Claims priority, application Japan, May 14, 1987, 62-117490
Int. Cl.[4] H01H *67/02*
U.S. Cl. 335—126 **15 Claims**

1. A magnet switch for shifting a pinion of a starter motor toward a ring gear of an internal combustion engine, and for supplying current from a battery to said starter motor comprising:
a cylindrical switch housing;
a coil unit having a bobbin provided within said switch housing, said bobbin comprising a cylindrical portion and a pair of end faces formed at both sides of said cylindrical portion, and a solenoid coil wound on said cylindrical portion of said bobbin;
a coil chamber formed between said coil unit and said switch housing;
a cylindrical non-magnetic sleeve touching an inner surface of said cylindrical portion of said bobbin so that said sleeve isolates between an inside and outside of said coil chamber;
a plunger having a movable contact and arranged movably inside of said sleeve so that said plunger shifts said pinion toward said ring gear when said solenoid coil is energized;
a switch cover comprising a contact chamber for covering said movable contact;



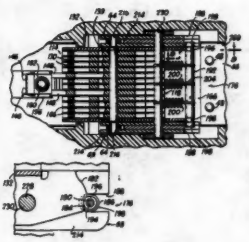
a fixed contact provided on said switch cover, and for supplying electrical power to said starter motor from said battery when said movable contact closes said fixed contact;
means, including said plunger, for defining a first passage between a contact chamber and said plunger chamber;
said sleeve and said cylindrical portion of said bobbin defining a second passage therebetween, said second passage connecting said coil chamber on said switch cover side and said plunger chamber on said switch cover opposite side; and
means for defining a third passage connecting said coil chamber with an outside of said switch housing.

4,887,057

CAM ROLL PIN ASSEMBLY

Lance Gula, Aliquippa, and Jere L. McKee, Scott Township, Lawrence County, both of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Aug. 1, 1988, Ser. No. 226,650
Int. Cl.[4] H01H *3/00, 75/00, 77/00*
U.S. Cl. 335—190 **15 Claims**



1. A cam roll pin assembly adapted to be received in a pair of slots formed in a circuit breaker housing for cooperating with cam surfaces formed on a movable contact assembly comprising:
an elongated shaft;
first contact surfaces rotatably mounted on said elongated shaft for engaging said cam surfaces in a first position and being disposed away from said cam surfaces in a second

position, said first contact surfaces rotated by said movable contact assembly; and

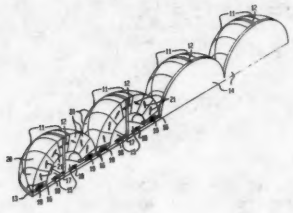
(a) second contact surfaces rotatably mounted on said elongated shaft for engaging said slots; wherein said first contact surfaces and said second contact surfaces are adapted to rotate independently of each other.

4,887,058

PERIODIC PERMANENT MAGNET STRUCTURES

Herbert A. Leupold, Eatontown, N.J., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Jul. 3, 1989, Ser. No. 375,218
Int. Cl.[4] H01F 7/22
U.S. Cl. 335—216 5 Claims



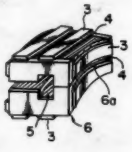
1. A periodic permanent magnet structure comprising a plurality of paired sections of hollow spherical flux sources having juxtaposed open ends, each flux source producing a uniform high-field in its central cavity, each pair of sections being mounted on opposite sides of a respective plate of permeable material so that the plate closes the open ends thereof, each flux source having an axial bore hole through the magnetic pole of the flux source, said bore hole continuing through each plate of permeable material, each set of paired sections being in tangential edge contact so that the magnetic field orientations are in alignment so as to form a continuous channel through the plurality of axially aligned flux sources, and a pair of superconducting planar sheets abutting the flat faces of each flux source.

4,887,059

IRON CORE OF ELECTROMAGNET AND METHOD OF PRODUCING THE SAME

Katsuhiko Asano, and Hiroshi Hashimoto, both of Hitachi, Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Jul. 2, 1987, Ser. No. 69,176
Claims priority, application Japan, Jul. 4, 1986, 61-156064
Int. Cl.[4] H01F 3/00
U.S. Cl. 335—281 10 Claims



1. An iron core comprising:

a stack of a plurality of steel sheets providing a sectional shape symmetrical with respect to a horizontal axis, said steel sheets being stacked perpendicular to said horizontal axis to form a one-piece iron core; and

a groove of a specified shape provided within said iron core;

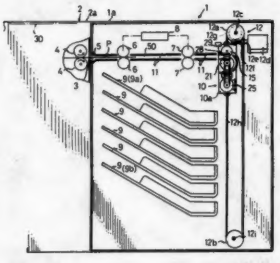
wherein said iron core has a substantially C-shaped section and a sector plane view, and side and end plates are attached to peripheral surfaces of said iron core, through which said steel sheets are welded and fixed together.

4,887,060

SHEET DISCHARGE DEVICE

Tamaki Kaneko, Fujisawa, Japan, assignor to O/A Technologies Inc., Irvine, Calif.

Continuation of Ser. No. 32,018, Mar. 30, 1987, abandoned. This application Apr. 3, 1989, Ser. No. 332,374
Claims priority, application Japan, Sep. 29, 1986, 61-230891; Sep. 30, 1986, 61-232791; Oct. 20, 1986, 61-247453; Oct. 20, 1986, 61-247454; Oct. 20, 1986, 61-247455; Oct. 20, 1986, 61-247456
Int. Cl.[4] G03G 15/00
U.S. Cl. 355—323 11 Claims



1. A sheet discharge device comprising:

a plurality of sheet trays vertically disposed at predetermined intervals,

a movable member disposed adjacent to said sheet trays and movable substantially up and down,

lift drive means for raising and lowering said movable member,

sheet pinch means disposed on said movable member for momentarily holding sheets discharge to the sheet discharge device,

sheet discharge means disposed on said movable member for transferring said sheets to the sheet trays,

drive means for driving one of said sheet pinch means and said sheet discharge means,

means disposed on said movable member for changing a carrying direction of the sheets transferred by said sheet discharge means, and

control means including means for controlling said movable member to stand by a home position to receive a sheet and to move to a target position while holding the sheet received using said sheet pinch means, said control means further including means for controlling said sheet discharge means to discharge the sheet onto a target sheet tray, and

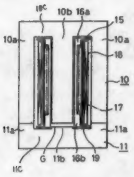
means for returning said movable member to said home position from said target position, said drive means for one of said sheet pinch means and said sheet discharge means being disposed on said movable member, and said lift drive means being disposed outside of said movable member.

4,887,061

TRANSFORMER FOR A FLYBACK TYPE CONVERTER

Tomoya Matsumura, Chiba, Japan, assignor to TDK Corporation, Tokyo, Japan

Filed Dec. 30, 1988, Ser. No. 292,007
Claims priority, application Japan, Jan. 18, 1988, 63-3819[U]
Int. Cl.[4] H01F 17/06, 27/30
U.S. Cl. 336—178 5 Claims



1. A transformer for a flyback converter type switching power source comprising;

a ferrite core (10,11) having a pair of side legs (10*a*, 11*a*) and a center leg (10*b*, 11*b*) which is shorter than said side legs, so that a gap G is provided on the center leg, and arms (10*c*, 11*c*) connecting said side legs with said center leg,

a bobbin (15) having a cylindrical hollow center body (15*a*) and a pair of flanges (15*b*), having windings on said hollow center body, assembled with said ferrite core so that said center leg is inserted into the hollow center body of the bobbin,

said gap G being located at end of said center leg (10*a*) under one of the extreme ends of said hollow center body of the bobbin (15), and

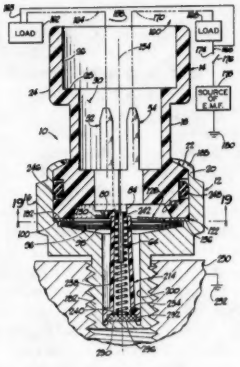
no coil means (16*a*, 16*b*) being provided for allowing no winding in predetermined axial and radial lengths from said gap.

4,887,062

THERMAL SENSOR ASSEMBLY

Howard W. Bletz, Worthington Twn., Richland County, Ohio, assignor to Hi-Stat Manufacturing Co., Inc., Sarasota, Fla.

Filed Jul. 28, 1988, Ser. No. 225,300
Int. Cl.[4] H01H 37/02, 71/16
U.S. Cl. 337—299 38 Claims



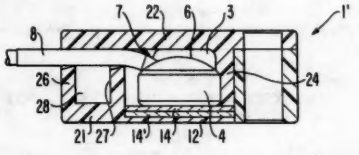
1. A thermal sensor assembly, comprising housing means, said housing means comprising a first probe-like housing section having first and second housing ends and a second housing section having third and fourth housing ends, wherein said first and second housing sections are joined to each other as to have said first and fourth housing ends operatively connected to each other as to be juxtaposed to each other, wherein said first housing section is intended for placement into a medium the temperature of which is to be monitored in a manner whereby said second housing end is situated in said medium, a plurality of electrical terminal means carried by said housing means for connection to associated electrical circuit means, thermistor means situated within said first housing section at a location relatively remote to said first and fourth housing ends and relatively close to said second housing end as to be responsible to the temperature of said monitored medium, electrical conductor means electrically interconnecting said thermistor means to a first of said plurality of electrical terminal means, and thermally responsive electrical switch means situated within said housing means in an area between said thermistor means and said fourth housing end, said thermally responsive electrical switch means being responsive to the temperature of said monitored medium and effective upon said monitored medium attaining a preselected magnitude of temperature for closing an electrical circuit through a second of said plurality of terminal means.

4,887,063

INSULATING CASING FOR THERMAL SWITCHES

Peter Hofsäss, Strietweg 45, 0-7530 Pforzheim, Fed. Rep. of Germany

Continuation of Ser. No. 61,227, Jun. 12, 1987, abandoned. This application Sep. 8, 1988, Ser. No. 241,479
Claims priority, application Fed. Rep. of Germany, Jun. 14, 1986, 8616132[U]
Int. Cl.[4] H01H 37/04
U.S. Cl. 337—380 7 Claims



1. A casing enclosing a bimetallic switch having connecting lines extending therefrom, the casing comprising a plastic envelope including a lower part and an upper part positively inserted in one another while merely leaving passage means for accommodating the connecting lines, at least one oxide ceramic plate member located in the casing, wherein the upper part has at least one shoulder through which the at least one ceramic plate member is pressed against a bottom of the lower part, and wherein the lower part includes two spaced webs forming an air chamber separate from a space accommodating the bimetallic switch and the at least one oxide ceramic plate member, said two spaced webs tightly engaging the connecting lines.

4,887,064

MULTI-FEATURED SECURITY SYSTEM WITH SELF-DIAGNOSTIC CAPABILITY

Ze'ev Drori, Chatsworth, and Manssor M. Amirpoor, Northridge, both of Calif., assignors to Clifford Electronics, Inc., Chatsworth, Calif.

Filed Dec. 28, 1987, Ser. No. 138,828
Int. Cl.[4] B60R 25/00
U.S. Cl. 340—426 67 Claims

1. A security system for monitoring and controlling access to a protected area and having self-diagnostic capability, comprising:

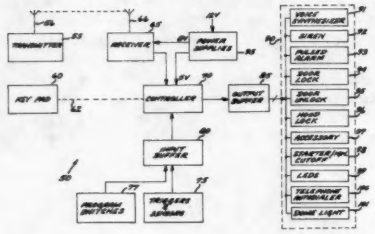
a plurality of sensor devices, each for sensing an intrusion event and providing a sensor activated signal when the event is detected;

means for communicating alert signals;

a controller for controlling the operation of said security

system so that said system may be operated in an armed mode wherein said controller monitors said sensor devices and causes said communicating means to issue an alert signal in response to a sensor activated signal, or in a disarmed mode wherein said system is disabled from communicating alert signals, said controller comprising:

(i) means for monitoring the state of each of said sensor devices;



(ii) means responsive to a system arming signal when the system is in the disarmed mode for identifying any sensor device providing a sensor activated signal; and

(iii) means for bypassing each of said identified sensor devices and placing the system in the armed mode wherein the state of said bypassed sensor devices does not prevent the system from being armed and wherein said bypassed sensor devices will not cause activation of said communicating means during said armed mode.

4,887,065

CONTROL SYSTEM FOR A COMBINED CENTRAL LOCKING AND BURGLAR ALARM SYSTEM FOR VEHICLES

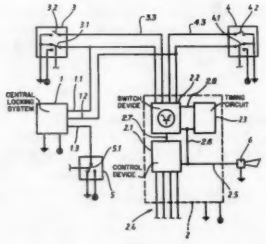
Peter Robitschko; Klaus Claar, both of Sindelfingen; Hans Deischl, Jettingen, and Josef Schumacher, Reutlingen, all of Fed. Rep. of Germany, assignors to Daimler-Benz AG, Stuttgart, Fed. Rep. of Germany

Filed Oct. 31, 1988, Ser. No. 264,542

Claims priority, application Fed. Rep. of Germany, Oct. 30, 1987, 3736776

Int. Cl.[4] B60R *25/10*

U.S. Cl. 340—430 **12 Claims**



1. A control system for controlling both a vehicle central locking system and a vehicle burglar alarm system from at least one locking point of the central locking system when operated by a designated key, said control system comprising:

(a) a locking contact means for providing indicating signals representing a position of a lock associated with the at least one locking point;

(b) a key detection switch means for providing a detection signal in response to the presence of the designated key at the at least one locking point;

(c) a burglar alarm control means for deactivating an unintentionally triggered alarm in response to a detection signal representing the presence of the designated key at the at least one locking point and for subsequently arming the burglar alarm system if the locking point is locked and for disarming the burglar alarm system if the locking point is unlocked in response to indicating signals from the lock contact means; and

(d) a switching means for connecting the burglar alarm control means to the locking point in response to a detection signal indicating the presence of the designated key at the at least one locking point.

4,887,066

CAPACITIVE OBSTACLE DETECTOR FOR VEHICLES IN REVERSE GEAR

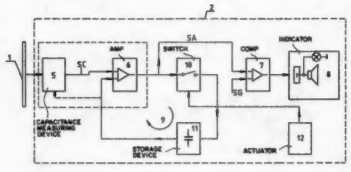
Jiri Marek, Baden, Austria, assignor to Setec Messgeräte Gesellschaft m.b.H., Vienna, Austria

Filed Jun. 11, 1987, Ser. No. 61,333

Claims priority, application Austria, Jun. 11, 1986, 1581/86

Int. Cl.[4] G08B *13/26*

U.S. Cl. 340—436 **6 Claims**



1. A capacitive proximity sensor assembly for motor vehicles comprising: at least one capacitor plate which is fixed to a motor vehicle; means for measuring the capacitance existing between said at least one capacitor plate and the environment, the capacitance changing when the capacitor plate on the vehicle comes close to an object; said measuring means comprising a measuring device for measuring the capacitance of said capacitor plate against the environment; a differential amplifier; said measuring device having an input coupled to said at least one capacitor plate and an output coupled to one input of said differential amplifier; said differential amplifier having a degenerative feedback control loop comprising a storage device and a switch all coupled in series with an output of said differential amplifier and another input of said differential amplifier, such storage device being provided for storing an instantaneous degenerative feedback signal so that when said switch is opened, the difference between said feedback signal and the capacitance being sensed generates an output signal; a comparator; said output of said differential amplifier being coupled to one input of said comparator; an indicator for indicating that the capacitor plate is close to an object; an output of said comparator being coupled to said indicator; another input of said comparator being coupled to a reference signal; and control means for controlling opening and closing of said switch.

4,887,067

WARNING DEVICE FOR PNEUMATIC VEHICLE TIRE

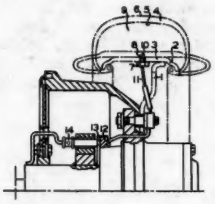
Erich Reinecke, Burgdorf, Fed. Rep. of Germany, assignor to WABCO Westinghouse Fahrzeugbremsen GmbH, Hanover, Fed. Rep. of Germany

Filed Aug. 16, 1988, Ser. No. 232,742

Claims priority, application Fed. Rep. of Germany, Aug. 21, 1987, 3727875

Int. Cl.[4] B60C *23/00*

U.S. Cl. 340—442 17 Claims



1. A warning device for use in combination with a pneumatic tire mounted on a vehicle wheel having tire and rim emergency operating capabilities, said warning device indicates a predetermined pressure condition existing in said pneumatic tire mounted on said vehicle, said combination of said warning device and said pneumatic tire comprising:

(a) a pneumatic tire having tire and rim emergency operating capabilities mounted on said vehicle;

(b) a measurement device mounted on one of said rim and a wheel flange of said vehicle wheel in a position to have at least a portion thereof extending into an inner space of said tire mounted on said rim, said measurement device producing a signal when a predetermined unapproved tire pressure for a given operating condition occurs, said measurement device includes a contact element one end of which extends into said inner space of said tire through one of a rim surface of said rim and said rim adjacent said rim surface, said contact element being mounted such that it is at least one of adjustable and operable by contact with an inner surface of said tire against said rim surface, said signal produced by said measurement device being produced by at least one of an adjustment an operation of said contact element;

(c) an adjustment mechanism positioned to rotate with said vehicle wheel, said adjustment mechanism includes an adjustment plunger which can be reset by a signal supplied to said adjustment mechanism from said measurement device;

(d) a contactless sensor rigidly-mounted on said vehicle in a predetermined relationship with respect to said adjustment mechanism to determine a relative position of said contact element of said measurement device; and

(e) at least one of a control device and an indicating device connected to be activated by a signal from said contactless sensor.

4,887,068

DISPLAY CONTROL APPARATUS FOR USE IN INTERNAL COMBUSTION ENGINE

Kazuhiro Umehara, Hamamatsu, Japan, assignor to Suzuki Jidosha Kogyo Kabushiki Kaisha, Shizuoka, Japan

Division of Ser. No. 900,875, Aug. 27, 1986, abandoned. This application Dec. 3, 1987, Ser. No. 129,321

Claims priority, application Japan, Sep. 30, 1985, 60-216368

Int. Cl.[4] B60Q *1/00*

U.S. Cl. 340—450.3 12 Claims

5. A display apparatus for use with an engine comprising: an oil level indicator which includes first, second and third light elements which emit a first light color when actuated and a fourth light element which emits a second light color when actuated, said second light element being disposed below said first light element, said third light element being disposed below said second light element, and said fourth light element being disposed below said third light element; and means responsive to a high level of oil in the engine for causing said

first, second and third light elements to be actuated and said fourth light element to be deactuated, and responsive to a subsequent progressive decrease of the oil level for causing said first and second light elements to be successively deactuated and for thereafter causing said third element to be deactuated and said fourth light element to be actuated.

4,887,069

PERIMETER INTRUSION DETECTION SYSTEM WITH BLOCK RANGING CAPABILITIES

Melvin C. Maki; Walter J. Feller, both of Kanata, and Edward L. Adams, Nepean, all of Canada, assignors to Control Data Canada Limited, Ottawa, Canada

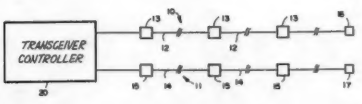
Filed Nov. 4, 1987, Ser. No. 116,587

Claims priority, application Canada, Nov. 6, 1986, 522372

The portion of the term of this patent subsequent to Nov. 7, 2006, has been disclaimed.

Int. Cl.[4] G08B *13/18;* H01P *3/00*

U.S. Cl. 340—552 21 Claims



1. A perimeter intrusion detection system, comprising:

first and second cables arranged along the perimeter and connected to a transceiver,

each cable having a plurality of sections separated by switching units, each section defining a pair of adjacent paths, one path being a well-shielded path and the other being an incompletely shielded path adapted to couple to an external field,

each switching unit being adapted to connect the incompletely shielded path of a selected single section of the first cable and the incompletely shielded path of a selected adjacent section of the second cable to said transceiver via the well-shielded paths of the intervening sections whereby the pair of selected sections are coupled by the external field and variations in the coupling detected at the transceiver indicate the presence of an intruder in the are of the selected sections.

4,887,070

APPARATUS FOR PROTECTING PERSONS ENTERING THE ZONE OF DANGER OF POWER-OPERATED TEXTILE MACHINES

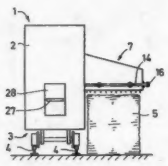
Akiva Pinto, Duesseldorf; Guenter Lucassen, Haltern, and Reinhard Schmidt, Gescher, all of Fed. Rep. of Germany, assignors to Hergeth Hollingsworth GmbH, Duelman, Fed. Rep. of Germany

Filed Sep. 19, 1988, Ser. No. 246,465

Claims priority, application Fed. Rep. of Germany, Oct. 8, 1987, 3733972

Int. Cl.[4] G08B *13/26*

U.S. Cl. 340—561 **9 Claims**



1. Apparatus for protecting persons entering a zone of danger in proximity to power-operated textile machines such as textile fiber bale opening machines having movable fiber reducing means and the like said machine consisting of a fiber opening means having a tower movable along a bale row, a cantilevered arm which carries said reducing means, and said sensor mean including a bar-shaped conductor carried about free sides of said cantilevered arm through which an electrical current is conducted to set up said field characterized by at least one safety sensor disposed near and around said an element of said power operated machine to be protected, means for generating an electromagnetic field in connection with said sensor, and a monitoring and control means connected to said sensor responsive to a change in said electromagnetic field caused by the presence of a person in said zone of danger.

4,887,071

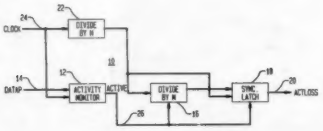
DIGITAL ACTIVITY LOSS DETECTOR

Nirmal S. Virdee, Phoenix, Ariz., assignor to Siemens Transmission Systems, Inc., Phoenix, Ariz.

Filed Aug. 18, 1988, Ser. No. 233,702

Int. Cl.[4] G08B *21/00*; G06F *11/00*

U.S. Cl. 340—659 **11 Claims**



1. A digital input signal activity loss detector circuit comprising:

monitoring means having said digital input signal and a clock signal coupled thereto for detecting data transitions in said digital input signal at a clock signal rate, and for providing an output signal indicative of the detection of a data transition;

divide-by-N circuit means for dividing said clock signal by N and providing an output;

divide-by-M circuit means for dividing the output of said divide-by-N circuit by M and providing an output;

synchronous latch means having coupled thereto the output of said divide-by-N circuit and the output of said divide-by-M circuit for generating a latch output indicative of a said digital input signal loss;

logic means coupling the output of said monitoring means to the divide-by-M circuit means and to the synchronous latch means such that said output of said monitoring means indicative of a transition resets said divide-by-M circuit means and resets said synchronous latch means and when no data transition is indicated for a predetermined signal loss threshold time period, said synchronous latch is set to generate said latch output indicative of said digital input signal loss.

4,887,072

ALARM APPARATUS

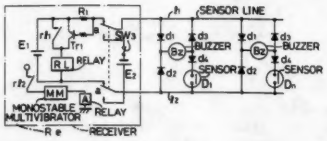
Tetsuo Kimura, and Akihiro Kobayashi, both of Tokyo, Japan, assignors to Nittan Company, Limited, Tokyo, Japan

Filed Mar. 3, 1988, Ser. No. 163,708

Claims priority, application Japan, Mar. 31, 1987, 62-75963

Int. Cl.[4] G08B *17/06, 25/00, 27/00*

U.S. Cl. 340—691 **9 Claims**



1. An alarm apparatus comprising:

a receiver having a pair of sensor lines proceeding therefrom;

a plurality of sensor means for sensing abnormal conditions connected in parallel across said sensor lines;

a plurality of audio signal generators connected in parallel across said sensor lines, at least one of said audio signal generators being associated with one of said sensor means;

a voltage supply means in said receiver connected across said sensor lines for supplying power to said sensor means and to said audio signal generator, said voltage supply means having two mutually exclusive states;

means in said receiver for changing the state of said voltage supply means after sensing of an abnormal condition by one of said sensor means; and

control means connected between each audio signal generator and said sensor lines for energizing said at least one audio signal generator with said voltage supply means in one of said states upon sensing of an abnormal condition by one of said sensor means, and for subsequently energizing at least one further audio signal generator with said voltage supply means in the other of said states upon the change os state of said voltage supply means.

4,887,073

CEILING MOUNTED FIRE DETECTOR ASSEMBLY

Kouichi Nakao, Mie; Akira Toki, Tsu; Kazushige Morisue, Mie, and Hiroyasu Kobayashi, Suzuka, all of Japan, assignors to Matsushita Electric Works, Ltd., Osaka, Japan

Filed Nov. 22, 1988, Ser. No. 274,564

Claims priority, application Japan, Apr. 8, 1988, 63-87642

Int. Cl.[4] G08B *17/10*; H01R *13/50*

U.S. Cl. 340—693 **6 Claims**

1. In a ceiling mounted fire detector assembly comprising:

a detector body and a mount base adapted to be secured to a ceiling surface and detachably receive therein said detector body;

said detector body including a sensor unit which produces an alarm signal upon sensing of a fire condition;

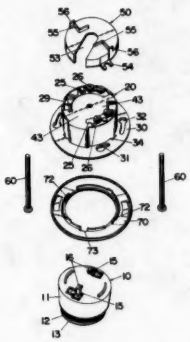
said detector body having on its top a set of conductor prongs for electrical and physical connections with a corresponding set of sockets provided on said mount base;

said mount base being in the form of a bottom-opened and

top-closed barrel with a side wall and an outwardly extending flange at the lower end of said side wall and adapted to fit within an opening in the ceiling surface with said flange abutting against the lower ceiling surface around said opening, said flange having mount holes for securing said mount base to said ceiling surface;

said mount base having slots in the top wall through which said conductor prongs extend upwardly and come into electrical and mechanical engagement with said socket as said detector body is rotated about its upright center axis;

said mount base being provided with a set of terminals elec-



trically interconnected to said set of sockets and adapted in use for wiring connection with a signal line routed in the ceiling in order to transmit the sensor output to said signal line;

said assembly characterized in that said set of terminals as well as said set of sockets are provided on the outer side of said top wall of said mount base such that said terminals are accessible exteriorly of said mount base for wiring connection with said signal line, in that a head cap is detachable to said mount base for shielding said terminals; and in that a bottom cover ring is attached to the undersurface of said flange to conceal said mount holes.

4,887,074

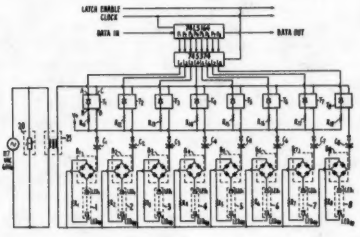
LIGHT-EMITTING DIODE DISPLAY SYSTEM

Michael Simon, and Benjamin Roque, both of 870 Robinhood Dr. #11, Reno, Nev. 89509

Filed Jan. 20, 1988, Ser. No. 145,898

Int. Cl.[4] G09G *3/32*

U.S. Cl. 340—782 **21 Claims**



1. A display system, including:

at least one LED;

a drive circuit having a finite, nonzero RC time constant, including a capacitor connected in series with the at least one LED, and capable of driving the at least one LED into a light-emitting mode in response to an alternating voltage signal, in which light-emitting mode each driven LED emits a train of light pulses separated by intervals of substantially zero light intensity, and in which light-emitting mode the drive circuit introduces a phase shift between the alternating voltage signal and the current through each driven LED to increase the duration of the substantially zero light intensity intervals beyond the duration said intervals would have if the capacitance of the drive circuit were zero, so as to reduce the average temperature of each LED in the light emitting mode below the average temperature each said LED would have if the capacitance of the drive circuit were zero;

a switch coupled with the drive circuit, and capable of switching in response to control signals between an on position in which the alternating voltage signal is supplied through the switch to the drive circuit, and an off position preventing the alternating voltage signal from propagating through the switch to the drive circuit; and

a drive controller coupled to the switch, for generating control signals and supplying said control signals to said switch, wherein each of the control signals coincides with a zero crossing of the alternating voltage signal.

4,887,075

LOCAL AREA NETWORK SYSTEM WITH A MULTI-COMPUTER SYSTEM COUPLED THERETO AND METHOD FOR CONTROLLING THE SAME

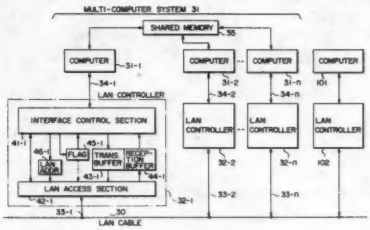
Yutaka Hirasawa, Kokubunji, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Jun. 17, 1988, Ser. No. 207,832

Claims priority, application Japan, Jun. 19, 1987, 62-151349

Int. Cl.[4] H04J *3/17;* **H04Q** *5/00*

U.S. Cl. 340—825.030 **14 Claims**



1. A local area network system including a plurality of computer systems, comprising:

a local area network bus for transmitting a frame containing frame data and a destination address;

a plurality of interface means connected to the local area network bus, each corresponding to one computer system of said plurality of computer systems and each assigned an identical address, for selectively receiving the frame over said local area network bus in accordance with the destination address of the frame and the identical address; and

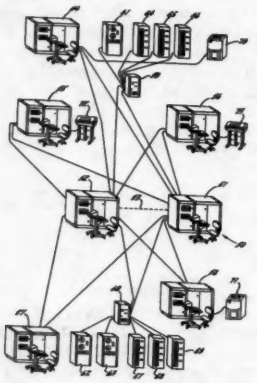
a plurality of transfer means, each coupled between a corresponding computer system of the plurality of computer systems and a corresponding interface means, for transferring frame data in the received frame from said corresponding interface means to said corresponding computer system in accordance with transfer available data indicating whether said corresponding computer system can receive the frame data.

4,887,076

COMPUTER INTERCONNECT COUPLER FOR CLUSTERS OF DATA PROCESSING DEVICES

Allan R. Kent, Arlington; Harold A. Read, Burlin, both of Mass.; Barry A. Henry, Penacook, N.H.; Charles E. Kaczor, Dudley, Mass.; Milton V. Mills, Boston, Mass.; Ronald C. Carn, Millis, Mass.; Donald R. Metz, Ashburnham, Mass.; Steven P. Zagame, Boylston, Mass., and Robert C. Kirk, Boylston, Mass., assignors to Digital Equipment Corporation, Maynard, Mass.

Filed Oct. 16, 1987, Ser. No. 110,513
Int. Cl.[4] H04Q *1/00*
U.S. Cl. 340—825.160 8 Claims



1. A computer interconnect coupler for transmitting messages among multiple data processing devices each of which has a communication port, said coupler comprising

a plurality of electronic switching means each of which is connected to a communication port of one of said data processing devices to provide a communication channel for receiving messages from and sending messages to that device, said switching means having separate receiving means and transmitting means for each of said channels,

a plurality of connections associated with each of said switching means for transmitting messages among said switching means,

central switch logic means connected to all of said switching means for assigning connections to transmit the messages arriving at one of said switching means from a source device to a switching means connected to a destination device designated by the message,

a first-in-first-out queue for queuing message information for messages which designate a common destination device whose communication channel is busy, and means for retrieving the oldest message information from said queue when said busy communication channel is no longer busy, and

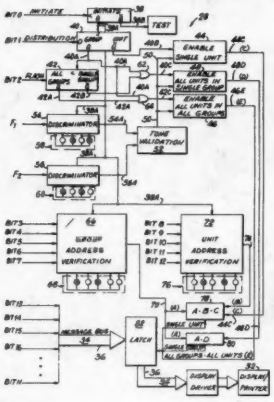
means responsive to the queuing of said message information when the communication channel designated by the message is busy for activating the transmitting means for the message-originating channel to send a flow control signal to the data processing device of that channel to inhibit the retransmission of messages from that device when said flow control signal is being transmitted, wherein said transmitting means includes means for inserting a message into said flow control signal so that the data processing device receiving said flow control signal can receive messages while the retransmission of outgoing messages from that device is inhibited.

4,887,077

SUBSCRIBER INVENTORY NETWORK

George P. Irby, III, DeSoto, and Stephen L. Rosenthal, Dallas, both of Tex., assignors to Metagram Services Inc., Manhasset, N.Y.

Filed Feb. 18, 1988, Ser. No. 151,511
Int. Cl.[4] H04Q *1/00*
U.S. Cl. 340—825.470 1 Claim



1. A subscriber inventory network for selectively disseminating messages to receiving units of one or more subscriber groups comprising:

a central message generator and transmitter for transmitting coded messages, each message including an initializer bit, a plurality of command bits, a plurality of group address bits, a plurality of unit address bits, and a plurality of message data bits, with each command bit and address bit having a first logic state and a second logic state;

at least one receiver in each group being responsive to said coded messages transmitted by said central message generator, each receiver including means for responding to command bits in said message from said transmitter received by said receiver;

each of said receivers having a pre-programmed group code identifier and a pre-programmed unit address identifier; and

each of said receivers including a message controller for receiving the message bits and for selectively communicating the message bits to a single unit of a single group, all units of a single group, or all units of all groups according to logic values associated with said command bits, respectively;

wherein said command bits include a group/unit distribution bit and an all group/single group flash command bit, said distribution command bit and said flash command bit being applied to first and second D flip-flops, respectively, with the distribution flip-flop being actuated by the initializer bit, and with the flash command flip-flop being actuated by the Q output of said distribution flip-flop;

the data output Q of the distribution flip-flop providing an enabling signal for the flash command flip-flop, and the complementary data output $\overline{Q}0$ of the distribution flip-flop providing an enabling signal for enabling a single receiving unit;

the data output Q of the flash command flip-flop providing an enabling signal for all units/all groups, and the complementary data output $\overline{Q}0$ of the flash command flip-flop providing an enabling signal for all units in a single group;

the data output Q of the distribution command flip-flop being combined with the complementary data output $\overline{Q}0$ of the flash command flip-flop in a first AND gate,

thereby producing a conditional enabling signal for all units in a single group; and

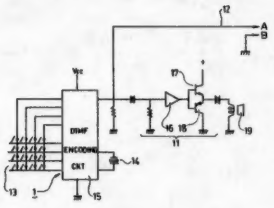
the data output Q of the distribution command flip-flop being combined with the data output Q of the flash command flip-flop in a second AND date for producing a conditional enabling signal for all units and all groups when both data output Q signals of the distribution command flip-flop and the flash command flip-flop are logic high.

4,887,078

DTMF-CODE CONTROLLED LOCK DEVICE

Jim Cho, 3rd Fl., No. 40, Alley 30, Lane 284, Wu-hsing St., Taipei, Taiwan

Filed May 5, 1988, Ser. No. 190,367
Int. Cl.[4] E04B *49/00*
U.S. Cl. 340—825.48 **3 Claims**



1. A DTMF-code controlled lock device comprising:

a key control means having a structure adapted for being carried by a user and including a first keyboard with a plurality of keys for being used to input preset unlocking DTMF code therefrom, a DTMF encoding circuit serving as a central part coupled with said first keyboard for encoding said unlocking DTMF code into mixed signals combined with two frequencies, and an amplifying circuit coupled with said DTMF encoding circuit for amplifying said mixed signals, and a sound generating means connected to said amplifying circuit for producing DTMF tone therefrom; and

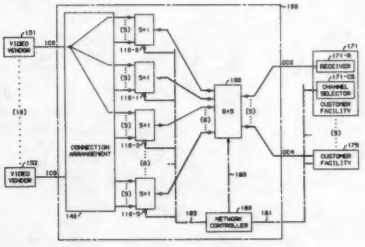
a lock-body control means adapted for being installed in a door together with a door lock, and including: a transducing means installed at a hidden place in a door for transferring said DTMF tone received from said sound generating means into DTMF signals; a tone amplifier and a sum amplifier connected in series with said transducing means for amplifying and combining said DTMF signals; a decoding circuit connected to said sum amplifier for decoding combined DTMF signals into BCD codes; a CPU having a plurality of memory units connected thereto coupled with said decoding circuit for storing preset unlocking codes and comparing with said BCD codes so as to output a high-level voltage therefrom if said BCD codes are found identical with preset unlocking codes; a first relay circuit connected between said CPU and a lock bolt for effecting unlocking operation according to said high-level voltage from said CPU; a telephone interfacing means having a transformer circuit for being electrically connected to a pair of telephone lines of a home key telephone set through a switch being used to connect said lock-body control means to the home telephone set, an amplifying circuit electrically connected to the input of said sum amplifier, a ringing detecting circuit coupled with said CPU for detecting and transmitting remote ringing signals to said CPU, and an electrical contact disposed in said transformer circuit for being actuated to close and open thereat; and a second relay circuit coupled between said CPU and the electrical contact of said transformer circuit for being energized by said CPU upon receiving a remote ringing signal so as to attract the electrical contact and close the circuit thereof; whereby, unlocking operation can be effected through the preset unlocking DTMF code keyed in either from said first keyboard or from a remote key telephone set by the user for achieving high security.

4,887,079

REARRANGEABLE MULTICONNECTION SWITCHING NETWORKS CONSTRUCTED USING COMBINATORIAL DESIGNS

Frank K. Hwang, Warren, N.J., and Gaylord W. Richards, Naperville, Ill., assignors to AT&T Bell Laboratories, Murray Hill, N.J.

Filed Dec. 23, 1986, Ser. No. 946,431
Int. Cl.[4] H04Q *1/00*
U.S. Cl. 340—825.800 **14 Claims**



1. A switching network for selectively connecting N_1 input channels to n_2 output channels such that none of said n_2 output channels is connected to more than one of said N_1 input channels at any time, N_1 and n_2 being positive integers each greater than one, n_2 being at most equal to N_1, said switching network comprising

v first stage switches each having at most r inlets and at least one outlet and each comprising means for selectively connecting any one of the inlets of said each first stage switch to the at least one outlet of said each first stage switch, v being a positive integer at least equal to n_2, r being a positive integer greater than one.

a second stage switch having n_2 outlets each connected to a different one of said output channels and having a plurality of inlets each associated with a different one of said first stage switches and each being connected to the at least one outlet of the associated first stage switch, said second stage switch comprising means for selectively connecting said outlets of said second stage switch to said inlets of said second stage switch and

connection means for connecting each of said inlets of said first stage switches to only an associated predetermined one of said input channels in accordance with a (b,c,r,M,w) block design, where each of said first stage switches has a unique switch designation, where b,c and M are positive integers each greater than one, where w is a positive integer, where M+w is greater than three, where b is at least equal to v, where c is at least equal to N_1, where the elements of said block are the switch designations of said first stage switches, and having the switch designation in a given row of said block design define the ones of said first stage switches connected to a given input channel associated with said given row.

4,887,080

STATIONARY TRAFFIC MONITORING DEVICE

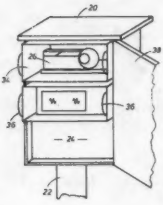
Mario Gross, Düsseldorf, Fed. Rep. of Germany, assignor to Robot Foto und Electronic GmbH U. Co. KG, Dusseldorf, Fed. Rep. of Germany

Filed Aug. 11, 1988, Ser. No. 231,158

Claims priority, application Fed. Rep. of Germany, Aug. 18, 1987, 3727503

Int. Cl.[4] G08G *1/10*

U.S. Cl. 340—937 **5 Claims**



1. A stationary traffic monitoring device comprising

a housing fixedly installed at an operation site, and

an insert having a recording camera and a control and evaluation unit adapted to receive data specific for the operation site,

in which

the data specific for the operation site are memorized in memory means, said memory means being adapted to transmit said data to the control and evaluation unit when the insert is inserted into the housing.

4,887,081

APPARATUS FOR DISPLAYING TRAVEL PATH

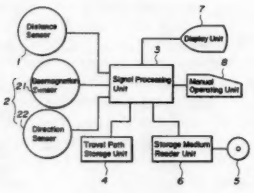
Akira Iihoshi; Yukinobu Nakamura, and Shinichiro Yasui, all of Saitama, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 9, 1987, Ser. No. 130,415

Claims priority, application Japan, Dec. 15, 1986, 61-298356

Int. Cl.[4] G08G *1/12*

U.S. Cl. 340—995 **1 Claim**



1. An apparatus for displaying a travel path, direction, and current location of a running body on a X-Y coordinate map with a north direction corresponding to the Y-direction of the X-Y coordinates in which the current location is successively computed from the respective outputs of a distance detector and of a direction detector comprising:

the direction detector including a geomagnetism sensor and a rate-type sensor;

the rate-type sensor detecting angular velocity;

means for finding and storing a difference in angle between a direction detected by the rate-type sensor and a direction detected by the geomagnetism sensor at the time when a power source is turned off during travel path displaying operation; and

means for correcting declination of the direction detected by the geomagnetism sensor by adding the stored difference in angle to the direction detected by the geomagnetism sensor at the time when the power source is turned on again, wherein when the power source is turned on said geomagnetism sensor corrected for declination of the detected direction is used exclusively to detect vehicle direction for a predetermined time sufficient for said rate-type sensor to achieve stability in performance, wherein once said stability in performance is achieved, signal processing means causes change over from the geomagnetism sensor to said rate-type sensor for exclusively detecting vehicle direction.

4,887,082

DATA INPUT APPARATUS

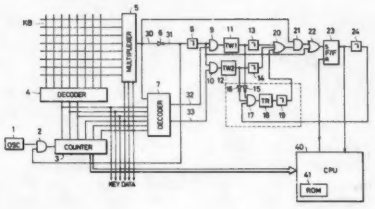
Yasuaki Yamada, Matsudo, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 710,071, Mar. 11, 1985, abandoned. This application Nov. 16, 1987, Ser. No. 120,787

Claims priority, application Japan, Mar. 15, 1984, 59-48170

Int. Cl.[4] G06F *3/02*

U.S. Cl. 341—26 **16 Claims**



1. A key input apparatus comprising:

key input means including a plurality of keys;

key data producing means for producing key data each associated with one of said keys, each said key datum being produced by said key data producing means in response to the operation of said associated key, each said key datum being capable of performing a repeated operation;

identification means for identifying an operated key in said key input means; and

control means, in response to the identifying of an operated key by said identification means, for varying the repeat waiting time for starting the repeated operataion.

4,887,083

BIPOLAR WITH EIGHT-ZEROS SUBSTITUTION AND BIPOLAR WITH SIX-ZEROS SUBSTITUTION CODING CIRCUIT

Toru Kosugi, Ohmiya; Takahiro Furukawa, Oyama, and Hirohisa Miyaou, Yokohama, all of Japan, assignors to Fujitsu Limited, Kawasaki, Japan

Filed Mar. 11, 1988, Ser. No. 167,235

Claims priority, application Japan, Mar. 12, 1987, 62-057226

Int. Cl.[4] H03M *5/18*

U.S. Cl. 341—56 **6 Claims**

1. A circuit for generating a bipolar coded signal corresponding to an input unipolar signal when the input unipolar signal does not include more, than eight consecutive zeros data under a bipolar signal having an eight-zeros substitution (B8ZS) mode or more than six consecutive zeros under a bipolar signal having a six-zeros substitution (B6ZS) mode, and generating a B8ZS violation coded signal when the input unipolar signal includes more than eight consecutive zeros data under the B8ZS mode or a B6ZS violation coded signal when the input unipolar signal includes more than six consecutive zeros data under the B6ZS mode, comprising:

a first shift register having eight series-connected flip-flops, receiving the input unipolar signal and shifting the same in response to a clock signal, the last two flip-flops in said series being reset under the B6ZS mode;

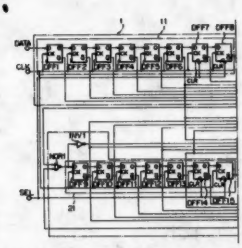
a first gate receiving outputs from all flip-flops in the first shift register and outputting a first consecutive zero detection signal when all flip-flops in the first shift register are reset;

a second shift register having seven series-connected flip-flops, the last two flip-flops in said series being reset under the B6ZS mode;

a second gate receiving outputs from all flip-flops in the second shift shift register and outputting a second consecutive zero detection signal when all flip-flops in the second shift register are reset;

a third gate receiving the first and the second consecutive zero detection signals from the first and the second gates and outputting a setting signal to the second shift register

Fig. 4
Fig.4A Fig.4B



when both the first and second consecutive zero detection signals indicate consecutive zeros, the second shift register shifting the output from the third gate in response to the clock signal;

an inverter receiving the output from the third gate and outputting an inverted signal,

a fourth gate receiving outputs from a sixth flip-flop in the first shift register, and a first, second, fourth and fifth flip-flop in the second shift register, and outputting a first original coded signal;

a fifth gate receiving outputs from the sixth flip-flop in the first shift register, the inverter, and the first, fourth and fifth flip-flops in the second shift register, and outputting a second original coded signal; and

an output circuit receiving the first and second original coded signals from the fourth and fifth gates, and outputting a positive pulse coded modulation signal and a negative pulse coded modulation signal which are used as a bipolar signal.

4,887,084

PRIORITY ENCODER

Seiji Yamaguchi, Hirakata, Japan, assignor to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Jun. 21, 1988, Ser. No. 209,641

Claims priority, application Japan, Jun. 23, 1987, 62-155844

Int. Cl.[4] H03M *1/36*

U.S. Cl. 341—160 **12 Claims**

1. A priority encoder comprising:

M×N input lines, wherein M and N are integers having a value greater than 1;

M N-bit input priority encoder units;

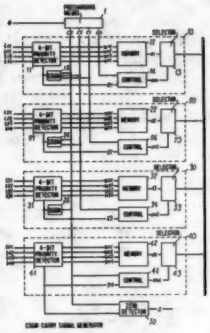
a precharging means for precharging M carry signals on M carry lines; and

a zero detecting means, coupled to said M N-bit input priority encoder units, for detecting when all of said M×N input lines are at a low signal level;

wherein a K-th N-bit input priority encoder unit, K being an integer from 1 to M, includes:

(a) an N-bit priority detecting means, coupled to N input lines and having N word lines and one zero detection line, for outputting a high signal level on said zero detection line when all of said N input lines are at said low signal level, and for outputting a low signal level on said zero detection line when at least one of said N input lines is at said high signal level, and for outputting a high signal level on one of said N word lines which corresponds to a highest priority designated input line having a high signal level, and for outputting a low signal level on the remaining of said N word lines;

(b) a memory means coupled to said N word lines for storing signals output from said N-bit priority detecting means on said N word lines;



(c) a selector coupled to said memory means for selecting and outputting an output value from said memory means;

(d) a carry signal generating means coupled to said zero detection line for generating the (K+1)-th through the M-th carry signals of said M carry signals; and

(e) a control means, coupled to said zero detection line and said selector and one of said M carry lines, for controlling said selector in accordance with a signal on said zero detection line and the K-th carry signal of said M carry signals.

4,887,085

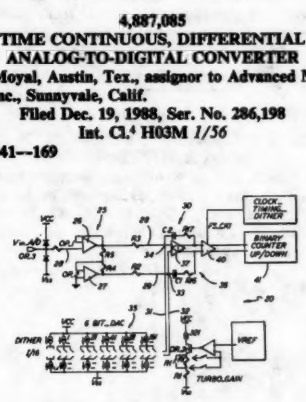
TIME CONTINUOUS, DIFFERENTIAL ANALOG-TO-DIGITAL CONVERTER

Miki Z. Moyal, Austin, Tex., assignor to Advanced Micro Devices, Inc., Sunnyvale, Calif.

Filed Dec. 19, 1988, Ser. No. 286,198

Int. Cl.[4] H03M *1/56*

U.S. Cl. 341—169 **9 Claims**



1. A time continuous, over-sampled, differential analog-to-digital converter, comprising:

input means defining a split input stage for supplying analog current signals;

a continuous, differential, non-switch capacitive integrator having common node feed-back, operatively connected to said split input stage;

a differential current generator forming a feedback loop circuit with said continuous, differential, non-switch capacitive, common node integrator for providing generated current signals;

a comparator operatively connected to said differential integrator within said loop circuit for digitizing analog signals, and for comparing generated current signals with analog current signals; and

a clocked, binary counter operatively connected to said comparator for incrementing or decrementing one step in response to each comparison of a generated current signal with an analog current signal.

4,887,086

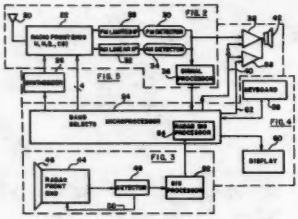
COMBINATION SCANNER AND RADAR DETECTOR

Bobby Unser, Albuquerque, N. Mex., and Stephen T. Crum, Indianapolis, Ind., assignors to Trycomm Technologies, Inc., Noblesville, Ind.

Filed Jul. 28, 1987, Ser. No. 78,775

Int. Cl.[4] G01S 7/40

U.S. Cl. 342—20 15 Claims



9. A radio receiver comprising in combination in an integral unit:

a scanning receiver for public service bands;

a citizen band receiver;

a traffic radar receiver adapted to receive a traffic radar signal such as in the K band or the X band; and

a microprocessor connected to the scanning receiver, the citizen band receiver, and the traffic radar receiver to control their operation such that the traffic radar receiver can override the scanning receiver or the citizen band receiver to provide an alarm upon detection of said traffic radar signal.

4,887,087

METHOD OF DISPLAYING DETECTED INFORMATION ABOUT A ROTATING MASS

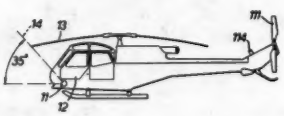
Walter A. Clearwater, Droitwich, England, assignor to Micro Control Technology Limited, Hampshire, England

Filed Mar. 14, 1983, Ser. No. 475,252

Claims priority, application United Kingdom, Mar. 16, 1982, 8207575; Apr. 22, 1982, 8211646

Int. Cl.[4] G01S 13/00

U.S. Cl. 342—61 7 Claims



1. A method of testing a helicopter rotor having blades, comprising the steps of receiving a signal from each of the rotating blades during each rotation of the rotor indicative of the angular position and height of the blade tip during that revolution while the helicopter is in flight, converting the indicative signals into electronic data, and storing the electronic data in a memory of a computer on board the helicopter and displaying pictorially the blade positions both in the helicopter and subsequently.

4,887,088

SIGNAL PROCESSING AND RADIO RANGING SYSTEM

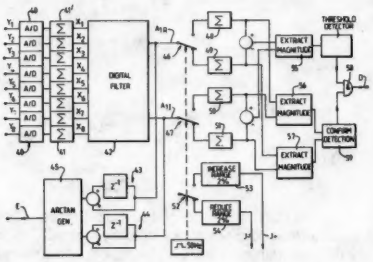
Andrew R. Beckett, Stevenage, England, assignor to British Aerospace Public Limited Company, London, England

Continuation of Ser. No. 20,198, Feb. 27, 1987, abandoned, which is a continuation of Ser. No. 786,527, Oct. 11, 1985, abandoned. This application Nov. 23, 1988, Ser. No. 275,596

Claims priority, application United Kingdom, Oct. 12, 1984, 8425874

Int. Cl.[4] G01S 13/26

U.S. Cl. 342—128 3 Claims



1. A method of radio ranging comprising the steps of:

receiving a radar return signal;

discriminating the radar return signal to form a plurality N of range channel signals X_1 to X_N representative of return signal components associated with respective ones of N consecutive range cells; and

determining the location of the centroid of a peak in the ripple envelope defined by the range channel signals by filtering those signals to form the real and imaginary components A_{1R} and A_{1I}, respectively, of the A_1 transform of a discrete Fourier transform:

$$A_r = \sum_{n=1}^{N} X_n e^{-j2\pi(n-1)r/N}$$

and then calculating a range error signal from the arctangent of $A_{1I}/-A_{1R}$.

4,887,089

PLANAR ANTENNA FOR VEHICLES

Yoshihisa Shibata, Kariya, and Hiroshi Mizuno, Nagoya, both of Japan, assignors to Nippondenso Co., Ltd., Kariya, Japan

Filed Jul. 7, 1984, Ser. No. 882,524

Claims priority, application Japan, Jul. 11, 1985, 60-152738

Int. Cl.[4] H01Q 00/00

U.S. Cl. 343—700 MS 6 Claims

1. A planar antenna for a vehicle comprising:

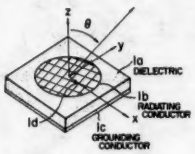
a dielectric substrate;

an antenna including a radiating conductor and a grounding conductor arranged on both sides of said dielectric substrate to oppose each other, said antenna being mounted on a surface of a vehicle;

at least one feeder connected to a feeding position of said radiating conductor suitable for excitation; and

means for exciting through said feeder said antenna substantially at a resonance frequency of a higher-order resonance mode higher than that of a primary resonance mode;

said antenna being a microstrip antenna having said dielectric substrate formed in a rectangular plate, said radiating



conductor formed in a circular plate mounted in a partial area on the side surface of said dielectric substrate and said grounding conductor mounted entirely on the opposite side surface of said dielectric substrate;

said microstrip antenna being excited in a higher-order excitation mode at a resonant frequency f_{nm} given as follows with a constant α_{nm} inherent to the mode, thickness h and dielectric constant ϵ of said dielectric substrate and radius a of said circular plate:

$$f_{nm} = \alpha_{nm} \cdot c/2\pi \cdot a_{eff} \cdot \sqrt{\epsilon}\ , \text{ and}$$

$$a_{eff} = a \cdot \left[1 + \left(\frac{2h}{\pi \cdot a \cdot \epsilon}\right) \cdot \left(\ln\left(\frac{\pi \cdot a}{2h}\right) + 1.7726\right)\right]^{\frac{1}{2}}.$$

4,887,090

VEHICLE ANTENNA WITH SHIFTABLE GAIN PATTERNS

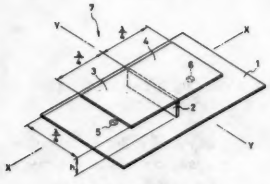
Yoshizo Shibano; Haruo Suzuki, and Tohru Iwai, all of Osaka, Japan, assignors to Sumitomo Electric Industries, Osaka, Japan

Filed Oct. 7, 1987, Ser. No. 105,374

Claims priority, application Japan, Oct. 7, 1986, 61-238298

Int. Cl.[4] H01Q *1/32, 3/30*

U.S. Cl. 343—711 **9 Claims**



1. A vehicle antenna comprising:

ground plane means;

short-circuit board means being mounted to said ground plane means in a substantially perpendicular manner;

antenna board means being mounted to said short-circuit board means such that a major plane of said antenna board means is divided into first and second antenna board portions which are substantially symmetrical about said short-circuit board means and which are substantially parallel to said ground plane means, said antenna board means being electrically connected to said ground plane means through an electrical conduction path provided by said short-circuit board;

means for receiving signals from a first signal feeding point on said first antenna board portion, and means for receiving signals from a second signal feeding point on said second antenna board portion, said signal feeding points being positioned symmetrically with respect to said short-circuit board means; and

signal processing means for selectively processing either signals from said first and second signal feeding points which have a first phase relationship to obtain a first directivity pattern for said antenna or signals from said first and second feeding points which have a second phase relationship to obtain a second directivity pattern for said antenna.

4,887,091

BROADCASTING RECEIVER FOR VEHICLES

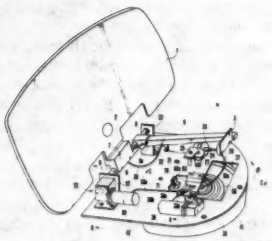
Takahiro Yamada, Tokyo, Japan, assignor to Aisin Seiki Kabushiki Kaisha, Aichi, Japan

Filed Mar. 21, 1988, Ser. No. 170,506

Claims priority, application Japan, Mar. 19, 1987, 62-039174[U]

Int. Cl.[4] H01Q *1/12, 3/08*

U.S. Cl. 343—714 **9 Claims**



1. A broadcasting receiver for vehicles which comprises:

a base plate disposed on a static portion of a vehicle for horizontal rotation about a vertical pivot axis,

a main reflector for receiving and reflecting broadcasting signals fixed to a rotation shaft attached to said base plate for rotation about an axis perpendicular to said base plate vertical pivot axis between a turned down position overlying said base plate and a projected stand up position,

an arm having one end attached to said base plate such that said arm is rotatable about a common axis with that of said rotation shaft,

a sub-reflector for reflecting broadcasting signals reflected by said main reflector and rotatably attached to one end of said arm,

a broadcasting signal detector attached to said main reflector for detecting signals reflected by said sub-reflector and transmitting them to the inside of the vehicle by means of a cord and,

a mechanism for preventing said cord from being twisted by rotation of the base plate.

4,887,092

THERMAL PRINTING METHOD

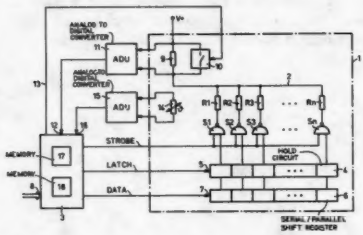
Wolfgang Pekruhn; Ralf Kaiser, and Hartmut Kirchhoff, all of Berlin, Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Dec. 7, 1988, Ser. No. 280,816

Claims priority, application Fed. Rep. of Germany, Dec. 7, 1987, 3741799

Int. Cl.[4] G01D *15/10*; A05B *3/02*; B41J *3/50*

U.S. Cl. 346—1.1 6 Claims



1. A thermal printing method wherein, for a cyclical drive of heating elements (R1 . . . Rn) of a thermal printing head, the temperature (T1 . . . Tn) of every individual heating element (R1 . . . Rn) is measured first in every drive cycle (t_A) before the heating element (R1 . . . Rn) intended for printing is charged with a current pulse (I1 . . . In) whose energy is controlled as a function of the measured temperature (T1 . . . Tn), comprising the steps of: at the beginning of each and every drive cycle (t_A), providing a cooling pulse (t_M) for all heating elements (R1 . . . Rn) following a respectively preceding drive cycle, the temperatures (T1 . . . Tn) of the heating elements (R1 . . . Rn) being successively measured during this cooling pulse; calculating cooling temperature values (TA1 . . . TAn) referred to a common point in time for all heating elements (R1 . . . Rn) from successively obtained measured temperature values (TM1 . . . Tmn) and from a characteristic cooling curve of the heating elements (R1 . . . Rn) that is stored in a first means for providing a memory; and, following the cooling pulse (t_M) simultaneously charging all heating elements (R1 . . . Rn) intended for printing with the current pulses (I1 . . . In) whose respective pulse duration is individually dimensioned for every heating element (R1 . . . Rn) dependent on the cooling temperature value (TA1 . . . TAn) calculated from the respective heating element (R1 . . . Rn).

4,887,093

MULTI-NOZZLE INK JET PRINTER

Paul A. H. Derks, Venlo, Netherlands, assignor to OCE-Nederland B.V., Venlo, Netherlands

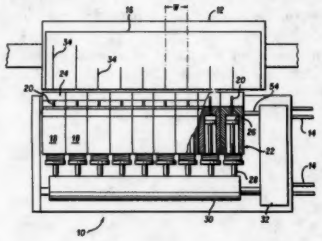
Filed Jul. 29, 1987, Ser. No. 79,249

Claims priority, application European Pat. Off., Aug. 6, 1986, 86201379.4

Int. Cl.[4] G01D *15/18*; E03B *5/00*

U.S. Cl. 346—75 7 Claims

1. An ink jet printer comprising a plurality of printing nozzles and an ink liquid supply system, said ink liquid supply system including a plurality of constant flow rate pumps, the number of said pumps being equal to the number of printing nozzles each of said pumps comprising a cylinder and a reciprocating piston which defines a pressure chamber within said cylinder, said plurality of cylinders being arranged side by side directly adjacent to the upstream ends of the associated nozzles, and each of said nozzles being connected to an associated one of said pumps by means of a fluid passageway.



4,887,094

THERMAL RECORDING APPARATUS

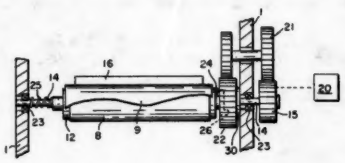
Masaki Izumi, and Tsutomu Miura, both of Tokyo, Japan, assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Dec. 22, 1988, Ser. No. 288,207

Claims priority, application Japan, Apr. 27, 1988, 63-105329

Int. Cl.[4] G01D *15/10*

U.S. Cl. 346—76 PH 1 Claim



1. A thermal recording apparatus comprising:

a recording head having a row of heating elements spaced at a pitch t;

means including a platen roller for supporting a sheet of recording paper adjacent to said recording head, said platen roller being supported for rotation and axial movement;

driving means for moving the sheet of recording paper in a direction substantially perpendicular to said row of heating elements;

means for shifting said platen roller relative to the sheet of recording paper in a direction parallel to said row of heating elements through a distance which is smaller than the pitch t of said heating elements; and

wherein said shifting means includes a frame, and cam means disposed between said platen roller and said frame and adapted to axially move said platen roller every time said platen roller rotates one full turn.

4,887,095

IMAGE RECORDING APPARATUS USING SEVERAL TYPES OF ENERGY AND RECORDING PROCESS

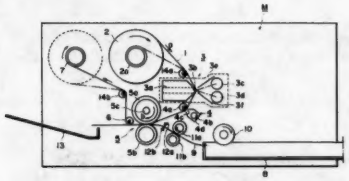
Masafumi Wataya, Tokyo; Yukio Sato, Kawasaki; Yoshihiro Ishida, Kawasaki, and Tadashi Yamamoto, Kawasaki, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 17, 1987, Ser. No. 27,219

Claims priority, application Japan, Mar. 20, 1986, 61-060634; Apr. 25, 1986, 61-094592; May 16, 1986, 61-110862; Jun. 28, 1986, 61-150677

Int. Cl.[4] G01D *15/10*

U.S. Cl. 346—76 PH 32 Claims



1. An image recording apparatus for recording an image on a recording medium, comprising:

a recording section employing a transfer recording medium having a transfer recording layer whose characteristics change upon application of a first energy and a second energy thereto, including first energy applying means for applying said first energy to said transfer recording medium, disposed along a conveying route of said transfer recording medium and second energy applying means for applying said second energy to said transfer recording medium;

a transfer section for transferring onto said recording medium an image formed on said transfer recording medium in said recording section; and

non-transfer means disposed upstream of said transfer section in the advancing direction of said transfer recording medium and adapted to make portions of said transfer recording layer other than an image-forming area non-transferable

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4,887,096

RECORDING APPARATUS

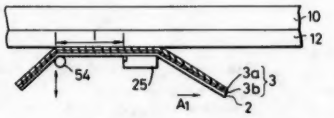
Osamu Asakura, Tokyo; Yoshio Uchikata, Yokohama; Kenji Kawazoe, Kawasaki; Akihiko Sukigara, Tokyo; Yoshikazu Shibamiya, Tokyo, and Shigeru Mizoguchi, Kawasaki, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 28,617, Mar. 20, 1987, abandoned. This application Oct. 24, 1988, Ser. No. 262,087

Claims priority, application Japan, Mar. 24, 1986, 61-65064; Mar. 24, 1986, 61-65065; Mar. 24, 1986, 61-65066; Mar. 24, 1986, 61-65067; Mar. 24, 1986, 61-65068; Mar. 24, 1986, 61-65069; Mar. 24, 1986, 61-65070

Int. Cl.[4] G01D *15/10*

U.S. Cl. 346—76 PH 19 Claims



1. A recording apparatus for recording on a recording medium by use of an ink sheet, comprising:

heating means for heating the ink sheet to record on the recording medium;

peeling means for peeling the ink sheet from the recording medium after heating of the ink sheet by said heating means; and

control means for controlling a condition of said peeling means on the basis of information relating to the recording on the recording medium,

wherein said control means controls said peeling means so as to initialize said peeling means at the time of an exchange of the ink sheet or at power-ON of the apparatus.

4,887,097

RECORDING MEDIUM AND INK-JET RECORDING PROCESS EMPLOYING THE SAME

Takashi Akiya, Yokohama, and Kenji Hasegawa, Isehara, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 16, 1987, Ser. No. 133,783

Claims priority, application Japan, Dec. 17, 1986, 61-298625

Int. Cl.[4] G01D *9/00*

U.S. Cl. 346—135.1 36 Claims

1. A recording medium comprising a substrate and an ink-receiving layer provided on said substrate, wherein said ink-receiving layer contains in combination, solvent-soluble resin (A) that is capable of absorbing water in an amount of at least 0.5 times as much as its own weight and is substantially water-insoluble, and particles of solvent-insoluble resin (B) that is capable of absorbing water in an amount of at least 50 times as much as its own weight, wherein said resin (A) is selected from the group consisting of

(a) a polymer complex comprising a basic polymer and an acidic polymer;

(b) a resin containing a repeating unit wherein a side chain having a hydroxyl group has a molecular weight of at least 74; and

(c) any of an ethylene oxide polymer having an average molecular weight of at least 100,000, a copolymer mainly comprising ethylene oxide, or a less water-soluble product of at least one of said ethylene oxide polymer or copolymer with monoisocyanate or polyisocyanate; and

wherein said resin (B) is a resin selected from the group consisting of sodium polyacrylate, vinyl alcohol/acrylamide polymer, sodium acrylate/acrylamide copolymer, carboxymethyl polymers and graft polymers, and hydrolysates of acrylonitrile or acrylic acid grafted compounds.

4,887,098

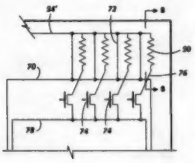
THERMAL INK JET PRINTER HAVING PRINTHEAD TRANSDUCERS WITH MULTILEVELINTERCONNECTIONS

William G. Hawkins, Webster, and Stephen F. Pond, Pittsford, both of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Filed Nov. 25, 1988, Ser. No. 275,991

Int. Cl.[4] G01D *15/16, 15/10;* H05B *15/10*

U.S. Cl. 346—140 R 11 Claims



1. An ink jet printhead of the type having a plurality of channels, each channel being supplied with ink and having an opening which serves as an ink droplet ejecting nozzle a heating element being positioned in each channel, ink droplets

being ejected from the nozzles by the selective application of current pulses to the heating elements in response to data signals from a data signal source, the heating elements transferring thermal energy to the ink causing the formation and collapse of temporary vapor bubbles that expel the ink droplets, said printhead further comprising a first and second electrically conductive common return, said common returns interconnected by leads extending between said heating elements, said heating elements connected between said first common return and said data signal source by a low resistance connection which is formed beneath or above said second common return.

4,887,099

SUBSTRATE FOR AN INK JET RECORDING HEAD HAVING ELECTRODES FORMED ON A GLAZE LAYER, AND A RECORDING HEAD AND APPARATUS USING THE SUBSTRATE

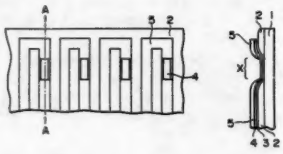
Haruhiko Terai, Yokohama, and Yasutomo Watanabe, Hiratsuka, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 28, 1988, Ser. No. 174,383

Claims priority, application Japan, Mar. 27, 1987, 62-71720; Mar. 25, 1988, 63-69680

Int. Cl.[4] G01D *15/16*; B41J *3/04*

U.S. Cl. 346—140 R **33 Claims**



1. A substrate for an ink jet recording head comprising:
a support member;
an electro-thermal converter, disposed on said support member, having a heat generating resistive layer and a pair of electrodes connected to said heat generating resistive layer to form a heat generating portion between said electrodes; and
a glaze layer of glazing material disposed on said support member underneath said electro-thermal converter, wherein said glaze layer is omitted at said heat generating portion between said pair of electrodes.

4,887,100

DROPLET DEPOSITION APPARATUS

A. John Michaelis, Glen Ellyn, Ill.; Anthony D. Paton; Stephen Temple, both of Cambridge, England, and W. Scott Bartky, Chicago, Ill., assignors to AM International, Inc., Chicago, Ill.

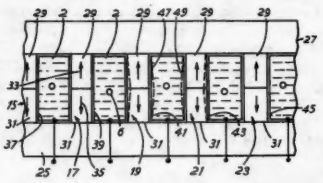
Filed Jan. 4, 1988, Ser. No. 140,617

Claims priority, application United Kingdom, Jan. 10, 1987, 8700533; Jan. 10, 1987, 8700531

Int. Cl.[4] G01D *15/16*; B41J *3/04*

U.S. Cl. 346—140 R **62 Claims**

1. A high density multi-channel array, electrically pulsed droplet deposition apparatus, comprising a multiplicity of parallel droplet liquid channels, mutually spaced in an array direction normal to the length of the channels, each of said channels being separated from a like channel by a side wall which is transversely displaceable in opposite senses and which extends in the lengthwise direction of the channels, and in a direction which is both normal to said lengthwise direction and normal to the array direction, respective nozzles opening into said channels for ejection therefrom of droplets of liquid, connection means for connecting said channels to a source of droplet deposition liquid and electrically actuable means located in relation to said channels for effecting in each channel selected for actuation, transverse displacement generally parallel to said array direction of said transversely displaceable side



wall of said selected channel to cause change of pressure in said selected channel to effect droplet ejection from the nozzle opening thereinto.

4,887,101

IMAGE FORMING APPARATUS

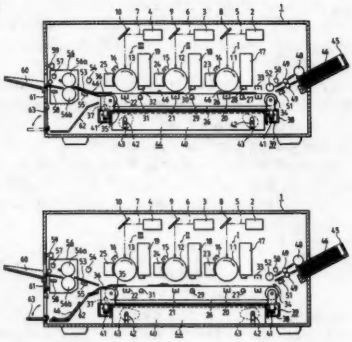
Yoshihiko Hirose; Tomohiro Aoki; Kazuyoshi Chiku, all of Yokohama; Yasushi Murayama, Tokyo; Takashi Uchida, Yokohama, and Kunihiko Matsuzawa, Kawasaki, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Apr. 13, 1989, Ser. No. 337,565

Claims priority, application Japan, Apr. 14, 1988, 63-90276

Int. Cl.[4] G01D *15/28*

U.S. Cl. 346—134 **21 Claims**

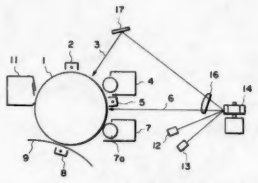


1. An image forming apparatus comprising:
a belt-shaped member for feeding a sheet;
at least one image forming means arranged in confronting relation to said belt-shaped member, for forming an image on said sheet being fed by said belt-shaped member;
a separation means for carrying out the separation between said belt-shaped member and said image forming means by shifting at least one of said belt-shaped member and image forming means;
a drive means for rotatingly driving said belt-shaped member;
a cleaning means for cleaning said belt-shaped member;
a signal generating means for emitting a signal; and
a control means for carrying out separation between said belt-shaped member and said image forming means by controlling said separation means and for then rotating said belt-shaped member at a speed faster than that of said belt-shaped member during the image formation by controlling said drive means, on the basis of said signal emitted from said signal generating means.

4,887,102
IMAGE FORMING APPARATUS

Masao Yoshikawa, Tokyo, and Tatuya Kobayashi, Yokohama, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Feb. 26, 1988, Ser. No. 161,029
Claims priority, application Japan, Feb. 27, 1987, 62-43025
Int. Cl.[4] G03G *15/01*; G01D *15/06*
U.S. Cl. 346—157 **20 Claims**



1. An image forming apparatus for sequentially forming a first toner image and a second toner image on a surface of an image bearing member, comprising:

developing means for developing first and second electrostatic latent images into the first and second toner images by a first developer including positively charged toner and a second developer, respectively;

wherein said developing means includes a developer carrying member for carrying the second developer spaced apart from said image bearing member by a distance d so as not to contact the first toner image, and means for applying a developing bias AC voltage which varies between a maximum voltage Vmax and minimum voltage Vmin to said developer carrying member to form an electric field between said image bearing member and said developer carrying member,

wherein

$$|Vmin - V_T/d \leqq 2.25 \text{ (V/micron)},$$

where V_T(V) is a potential of the first toner image immediately before formation of the second toner image by said developing means, the potential of the first toner image being a surface potential of the first toner image under existence of the first latent image.

4,887,103
IMAGE FORMING APPARATUS AND DEVELOPING DEVICE THEREOF

Nobuhiro Imai, Kawasaki, and Fumio Asano, Noda, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Apr. 20, 1989, Ser. No. 340,788
Claims priority, application Japan, Apr. 23, 1988, 63-101176
Int. Cl.[4] G01D *15/00*
U.S. Cl. 346—160.1 **12 Claims**

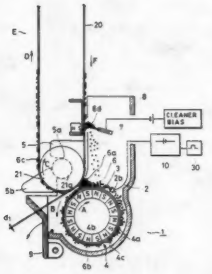
1. An image forming apparatus in which an image is formed on a recording medium by means of developer which passes a group of electrodes, comprising:

a magnetic field generating means and a developer conveying member provided around said magnetic field generating means in an arrangement so as to be movable in an image movement direction relative to said magnetic field generating means for supporting and conveying electrically conductive, magnetic developer;

a recording medium provided in opposed relation with said developer conveying member for recording; and

a group of recording electrodes located at a position of shortest distance between said developer conveying member and said recording medium, said group of recording electrodes being arranged in a direction transverse to said image movement direction, wherein said developer is brought into contact with the side of said group of recording electrodes which is closer to said recording medium by the magnetic force generated by said magnetic field generating means,

the length of said group of recording electrodes in a direction transverse to said image movement direction is less than the length of magnetic poles of said magnetic field

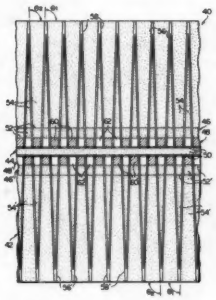


generating means in said transverse direction, said group of recording electrodes being located between the ends of said magnetic field generating means, and said magnetic field generating means being located between the opposite edges of said developer conveying member in a direction transverse to said image movement direction.

4,887,104
ELECTROOPTICAL LIGHT SHUTTER DEVICE AND PRINTER APPARATUS USING SAME

Hirohisa Kitano, Osaka; Itaru Saito, Hyogo; Kouichi Shingaki; Ken Matsubara, both of Osaka, and Tomohiko Masuda, Hyogo, all of Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed Nov. 16, 1987, Ser. No. 120,949
Claims priority, application Japan, Nov. 19, 1986, 61-276328; Dec. 26, 1986, 61-314396; Feb. 2, 1987, 62-22920; Feb. 2, 1987, 62-22921; Aug. 3, 1987, 62-194722; Aug. 3, 1987, 62-194721; Sep. 21, 1987, 62-238026
The portion of the term of this patent subsequent to Aug. 8, 2006, has been disclaimed.
Int. Cl.[4] G02F *1/03*
U.S. Cl. 350—355 **34 Claims**



1. An electrooptical light shutter device for use in an optical printer apparatus, said device comprising:

a number of shutter elements arranged in the form of a linear array, each of said shutter elements forming a part of a strip of material having an electrooptical effect and being provided in the form of a bock defined by a plurality of grooves which includes a first groove extending in paral-

lel with the direction in which said shutter elements are arranged, a second groove deeper than said first groove and extending in parallel with the direction in which said shutter elements are arranged, and a plurality of third grooves deeper than said first groove, shallower than said second groove, and extending in a skewing relationship to the direction in which said shutter elements are arrange, each of said shutter elements being provided with a pair of electrode segments provided in said first groove and second groove, respectively;

a polarizer disposed on a light-incoming side of the array of said shutter elements, and

an analyzer disposed on a light-outgoing side of the array of said shutter elements, wherein said shutter elements have respective shutter windows through which light is to be passed selectively.

4,887,105

DATA INPUT/OUTPUT DEVICE FOR A CAMERA

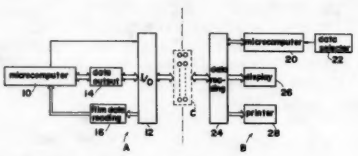
Norio Ishikawa, Osaka, and Toshihiko Ishimura, Habikino, both of Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Continuation of Ser. No. 127,556, Dec. 1, 1987, abandoned, which is a continuation of Ser. No. 53,553, May 21, 1987, abandoned, which is a continuation of Ser. No. 881,280, Jul. 2, 1986, abandoned. This application Sep. 8, 1988, Ser. No. 243,174

Claims priority, application Japan, Jul. 4, 1985, 60-147215

Int. Cl.[4] G03B *7/24, 17/18*

U.S. Cl. 354—21 **3 Claims**



1. A camera, comprising:

at least one electrical terminal for contacting at different times a film cartridge and a reading device;

switching means having a first state and a second state;

means for reading an exposure code from said film cartridge through said electrical terminal when said switching means is in said first state;

digital means responsive to said reading means for controlling photographic operations; and

means for impressing upon said electrical terminal a digital signal derived from said digital means when said switching means is in said second state.

4,887,106

METHOD AND APPARATUS FOR PHOTOGRAPHIC ANALYSIS OF DENTAL RESTORATIONS

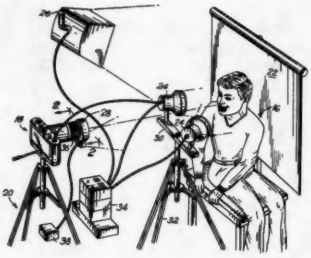
Henry H. Cooper, Jr., 8 E. 93rd St., New York, N.Y. 10128

Filed Jan. 23, 1989, Ser. No. 299,697

Int. Cl.[4] G03B *29/00*

U.S. Cl. 354—62 **5 Claims**

1. An apparatus for the recordation of images indicating the location of dental restorations in the mouth of an individual, comprising support and positioning means for the person whose dental features are to be recorded; a first source of ultraviolet light located and arranged to illuminate the mouth area of the patient; means for adjusting the light output of said ultraviolet light source; a second source of visible light located and arranged to illuminate at least the face area of the patient; means for adjusting the light output of said second visible light source; and camera means located and positioned to take a



photograph of at least said mouth area while at least said face area is illuminated by said first and second light sources.

4,887,107

CAMERA

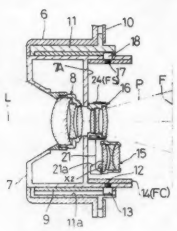
Ikushi Nakamura; Hiroshi Ootsuka, both of Sakai; Akira Fukushima, Osaka; Yoshinobu Kudo, Sakai; Yoshiaki Hata, Toyonaka; Manabu Inoue, Kobe, and Norihiro Inoue, Nara, all of Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed Apr. 6, 1989, Ser. No. 333,861

Claims priority, application Japan, Jul. 29, 1986, 61-178396; Jul. 29, 1986, 61-178397; Jul. 29, 1986, 61-178398; Jul. 29, 1986, 61-178399

Int. Cl.[4] G03B *3/00*

U.S. Cl. 354—195.12 **16 Claims**



1. A camera comprising:

a main lens component disposed in a photographic optical path;

a first auxiliary lens component movable into and out of the photographic optical path and cooperable with said main lens component to provide a long focal length;

a second auxiliary lens component movable into and out of the photographic optical path and cooperable with said main lens component to provide a short focal length;

means for selecting one of the long focal length, the short focal length and an intermediate focal length; and

control means operable in response to said selecting means to bring said second auxiliary lens component into the photographic optical path and retract said first auxiliary lens component from the photographic optical path when the short focal length is selected, to retract both of said first auxiliary lens component and said second auxiliary lens component from the photographic optical path when the intermediate focal length is selected, and to bring said first auxiliary lens component into the photographic optical path and retract said second auxiliary lens component

from the photographic optical path when the long focal length is selected.

4,887,108

PHOTOGRAPHIC CAMERA

Nobuyuki Taniguchi, Nishinomiya; Takeo Hoda, Kawachinagano; Yoshiaki Hata, Nishinomiya; Manabu Inoue, Kobe; Yoshinobu Kudo, Sakai, and Hiroshi Ueda, Toyokawa, all of Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

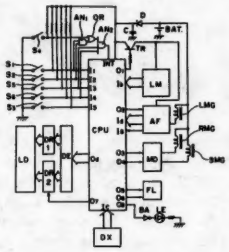
Division of Ser. No. 937,509, Dec. 3, 1986, Pat. No. 4,768,047. This application May 26, 1988, Ser. No. 199,201

Claims priority, application Japan, Dec. 4, 1985, 60-271630; Dec. 4, 1985, 60-271631; Dec. 16, 1985, 60-281051

The portion of the term of this patent subsequent to Aug. 30, 2005, has been disclaimed.

Int. Cl.[4] G03B *7/099*

U.S. Cl. 354—195.1 **4 Claims**



1. A photographic camera comprising:

means for selecting between a real focal length photographing mode and a pseudo focal length photographing mode, a field to be printed in the pseudo focal length photographing mode being narrower than that in the real focal length photographing mode;

means for measuring a brightness of an object to produce a first signal in accordance with the measured brightness;

means for outputting a second signal in accordance with a film speed; and

means for controlling an exposure in accordance with the first and second signals, said controlling means including means, responsive to said selecting means, for shifting the exposure to an overexposure side in the pseudo focal length photographing mode relative to the case in the real focal length photographing mode.

4,887,109

VIEWFINDER FOR A CAMERA WITH CHANGEABLE FOCAL LENGTH

Yoshihiro Fujita; Hiroshi Komatsuzaki, both of Tokyo; Masao Shoji, Saitama; Yukio Noguchi, Saitama; Masayoshi Hirai, Saitama, and Kazunori Ohno, Saitama, all of Japan, assignors to Fuji Photo Film Co. Ltd., Kanagawa, Japan

Filed May 27, 1988, Ser. No. 199,756

Claims priority, application Japan, May 27, 1987, 62-80676[U]; May 27, 1987, 62-80677[U]; Apr. 13, 1988, 63-90854

Int. Cl.[4] G03B *13/14*

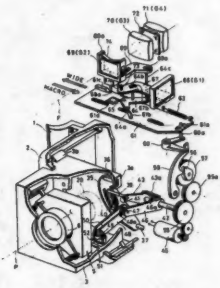
U.S. Cl. 354—222 **10 Claims**

1. A camera having a viewfinder separate from a taking lens of the camera, said taking lens being changeable between a relatively short focal length suitable for wide-angle photography and a relatively long focal length suitable for telephotography, said viewfinder comprising:

an eyepiece lens fixed to a camera body of said camera;

a first movable lens disposed in front of said eyepiece lens which is axially moved when said taking lens is changed between said relatively short and long focal lengths;

a second movable lens adapted to be moved into the optical path of said finder and in front of said first movable lens when said taking lens is changed to have said relatively short focal length suitable for wide-angle photography; and



means for shifting one of said first and second movable lenses away from the optical axis of said viewfinder relative to the optical axis of said taking lens when said taking lens is changed to have said relatively short focal length.

4,887,110

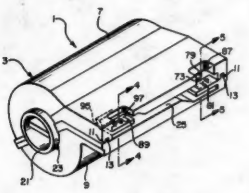
FILM CASSETTE

Donald M. Harvey, Webster, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Jan. 12, 1989, Ser. No. 296,473

Int. Cl.[4] G03B *17/26*

U.S. Cl. 354—275 **9 Claims**



1. An improved film cassette wherein a filmstrip is advanced to the outside of a light-tight cassette shell in order to expose successive imaging areas of said filmstrip and can be returned to the inside of said cassette shell before all of said imaging areas have been exposed or after the filmstrip has been substantially completely exposed, and wherein the improvement comprises:

visual indicator means for providing respective visible indications that said filmstrip when returned to said cassette shell is substantially completely exposed or has at least one imaging area which remains to be exposed, whereby one is alerted that said filmstrip is either fully or partly used.

4,887,111

ADJUSTABLE FILM CARTRIDGE

Charles J. Hsiung, 500 S. Atlantic Blvd., Monterey Park, Calif. 91754

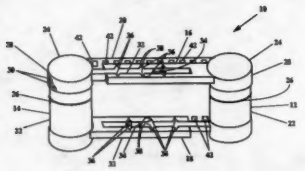
Filed Sep. 22, 1988, Ser. No. 247,621

Int. Cl.[4] G03B *17/26*

U.S. Cl. 354—275 **22 Claims**

1. A film cartridge comprising:

a film supply housing;
a film storage housing; and



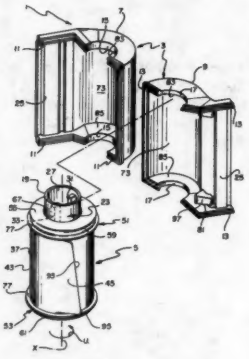
at least one bridge means detachably connecting the said housings and serving to maintain a desired spacing between said housings.

4,887,112

FILM CASSETTE

John J. Niedospial, Jr.; Jeffrey C. Robertson, both of Rochester, and Mark D. Fraser, Brockport, all of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Jan. 12, 1989, Ser. No. 296,551
Int. Cl.[4] G03B *17/26*
U.S. Cl. 354—275 **4 Claims**



1. An improved film cassette wherein (a) an outermost convolution of a film roll coiled about a spool core is radially constrained by respective annular lips of a pair of flanges on said spool core to prevent said outermost convolution from contacting an interior wall of the cassette shell, (b) a trailing end of said film roll is secured to said spool core, and a leading section of the film roll is reduced in width to allow it to protrude from between said annular lips and rest against said shell wall, and (c) rotation of said spool core and said flanges in an unwinding direction operates to automatically advance said leading section into and through a film passage slit to the exterior of said cassette shell, and wherein the improvement comprises:

said spool core is coaxially coupled with said flanges to allow initial rotation of the spool core relative to the flanges in the unwinding direction to urge said film roll to expand radially until there is achieved a non-slipping relation between said outermost convolution and said annular lips, to thus cause the flanges to be rotated with the spool core when the spool core is further rotated in the unwinding direction; and

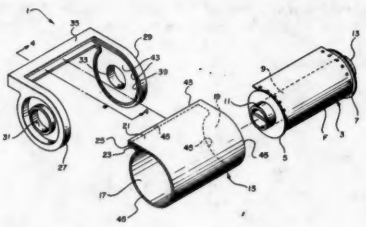
said leading section converges substantially similarly along opposite longitudinal edges to allow said edges to equally separate from said respective lips and it has a very short length as compared to said outermost convolution to allow only a relatively small forward portion of the leading section to contact said shell wall, whereby said leading section is more easily able to seek entry to said film passage slit.

4,887,113

FILM CASSETTE AND METHOD OF ASSEMBLING THE SAME

John J. Niedospial, Jr., Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Jan. 12, 1989, Ser. No. 296,550
Int. Cl.[4] G03B *17/26*
U.S. Cl. 354—275 **4 Claims**



1. A film cassette comprising (a) a film spool, (b) a tubular-like casing substantially surrounding said film spool and having a pair of spaced lips which define a film passage slit from said film spool, and (c) a pair of end caps covering respective opposite ends of said tubular-like casing, characterized in that:

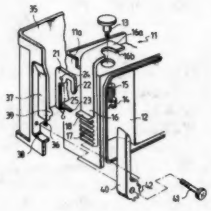
said end caps are connected by an intermediate bridge portion which encloses said lips and includes a film passage opening to said film passage slit.

4,887,114

BACK-COVER RELEASE DEVICE FOR A CAMERA

Masato Yamamoto; Masahiro Nakajima, and Toshimasa Yamanaka, all of Tokyo, Japan, assignors to Asahi Kogaku Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 8, 1989, Ser. No. 320,660
Claims priority, application Japan, Mar. 11, 1988, 63-32281[U]
Int. Cl.[4] G03B *17/02*
U.S. Cl. 354—288 **4 Claims**



1. A back-cover release device for unlocking a back-cover of a camera, comprising:

a back-cover lock member urged in a direction to lock the back-cover;

an operating lever pivotably disposed along a side of said camera and operable externally of the camera so as to be angularly displaced therefrom; and

an interlocking plate for interlocking the operating lever with the back-cover lock member, the operating lever being engageable with the interlocking plate after the operating lever is angularly rotated through a predeter-

mined preliminary angle in an opening direction from a position where the operating lever is disposed along the camera body so as to displace said interlocking plate and to correspondingly displace said lock member to unlock said back-cover.

4,887,115

PHOTOGRAPHIC CAMERA

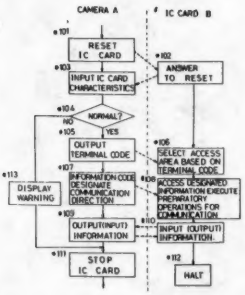
Manabu Inoue, Kobe; Nobuyaki Taniguchi; Yoshiaki Hata, both of Nishinomiya; Takeo Hoda, Kawachinagano; Yoshinobu Kudo, Sakai, and Hiroshi Ueda, Toyokawa, all of Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Division of Ser. No. 160,833, Feb. 26, 1988, which is a division of Ser. No. 21,659, Mar. 4, 1987, Pat. No. 4,728,978. This application Oct. 19, 1988, Ser. No. 259,897

Claims priority, application Japan, Mar. 7, 1986, 61-50871; Mar. 7, 1986, 61-50872; Mar. 7, 1986, 61-50873; Mar. 7, 1986, 61-50874; Mar. 10, 1986, 61-52170

Int. Cl.[4] G03B *17/24*

U.S. Cl. 354—289.1 **3 Claims**



1. A photographic camera comprising:

an attaching portion adapted for detachably attaching an IC card including semiconductor memory means capable of reading-out/writing-in, a circuit for communicating data between the semoconductor memory means and the camera to which the IC card is loaded and a data exchange terminal for the communication of the data;

communication means for communicating data with said IC card;

detecting means for detecting whether or not the IC card is loaded in the camera in response to said data communication; and

varying means for varying a camera operation in response to the detection by said detecting means.

4,887,116

LIGHT-SENSITIVE MATERIAL FEEDING RACK

Kaoru Uchiyama; Tetuya Ishizuka, both of Tokyo, and Kiichiro Sakamoto, Kanagawa, all of Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Sep. 2, 1988, Ser. No. 239,716

Claims priority, application Japan, Sep. 2, 1987, 62-219583; Oct. 9, 1987, 62-255049

Int. Cl.[4] G03D *3/13*

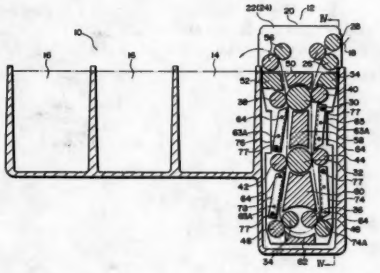
U.S. Cl. 354—320 **18 Claims**

1. A light-sensitive material feeding rack for feeding a light-sensitive material along a feeding path within a processing tank, comprising:

a rack body disposed within said processing tank;

feed rollers rotatably supported by said rack body and paired for feeding said light-sensitive material held between pairs of said feed rollers; and

guide means extending along said feeding path of said light-sensitive material for guiding said light-sensitive material to a light-sensitive material entrance side of said pairs of feed rollers, said guide means being rotatable about an end portion thereof that is closer to said light-sensitive material entrance said, said guide means comprising a plurality of guide plates disposed at equal intervals in a widthwise direction of said feeding path.



4,887,117

CAMERA HAVING AUTO-FOCUS DEVICE

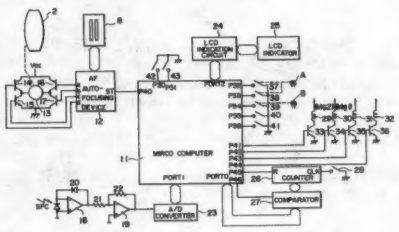
Ryuichi Kobayashi, Kawasaki, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Sep. 13, 1988, Ser. No. 243,700

Claims priority, application Japan, Sep. 18, 1987, 62-234574

Int. Cl.[4] G03B *3/00, 7/091, 17/38*

U.S. Cl. 354—400 **7 Claims**



1. A camera having an auto-focus device, comprising:

(a) a first operation member;

(b) an auto-focus control circuit having first and second modes, said auto-focus device being operated upon operation of said first operation member and said auto-focus device being disabled upon release of said first operation member in the first mode, and said auto-focus device being operated by a second operation member different from said first operation member and said auto-focus device being disabled upon operation of said first operation member in the second mode; and

(c) selecting means for selecting the first or second mode.

4,887,118

ELECTRONIC FLASH CAMERA HAVING REDUCED CYCLE TIME

John P. Gaewsky, Reading, Mass., assignor to Polaroid Corporation, Cambridge, Mass.

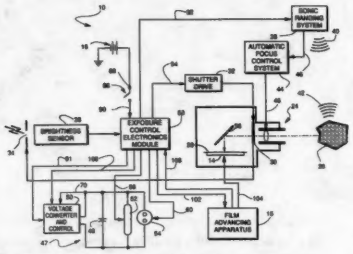
Filed Dec. 27, 1988, Ser. No. 289,780

Int. Cl.[4] G03B *15/05, 17/52*

U.S. Cl. 354—413 **9 Claims**

1. A self-developing camera having a reduced exposure cycle time, comprising:

an electronic flash for providing artificial illumination during an exposure;
a battery for supplying electrical power to said camera;
means for sensing the magnitude of the voltage of said battery;
means including an electrical drive motor for transporting and processing an exposed film unit; and
control means responsive to said voltage sensing means for



enabling said electronic flash to operate in a charging mode during the operation of said drive motor when the voltage sensed by said voltage sensing means is equal to or greater than some predetermined magnitude, and for precluding the operation of said electronic flash in said charging mode when said sensed voltage is less than said predetermined magnitude while simultaneously maintaining operation of said drive motor to thereby reduce the overall time required to complete an exposure cycle.

4,887,119

PHOTOGRAPHIC CAMERA SYSTEM

Toshihiko Ishimura, Habikino; Kenji Tsuji, Kashiwara; Nobuyuki Taniguchi, Nishinomiya, and Hiroshi Ootsuka, Sakai, all of Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Continuation of Ser. No. 912,377, Sep. 29, 1986, abandoned. This application Jun. 23, 1988, Ser. No. 211,176

Claims priority, application Japan, Sep. 30, 1985, 60-218761; Oct. 3, 1985, 60-220997

Int. Cl.[4] G03B *15/05*

U.S. Cl. 354—413 **12 Claims**

1. A photographic camera system comprising a camera and an electronic flash device,

(a) said electronic flash device including:

(1) operational means for outputting a control signal in response to a manual operation,

(2) light emission quantity information output means for outputting data corresponding to a light emission quantity, and

(3) a first group of terminals for electrically connecting said electronic flash device to said camera and for providing the control signal and the light emission quantity data therethrough,

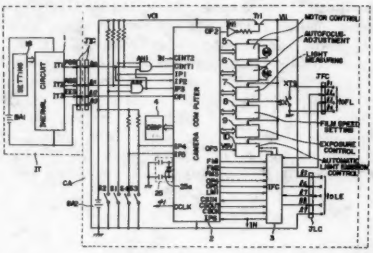
(b) said camera including:

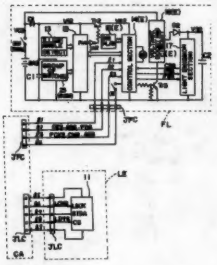
(1) a second group of terminals electrically connected to said first group of terminals,

(2) input means for inputting the control signal and the light emission quantity data through said second group of terminals,

(3) a circuitry for carrying out preparatory operation for a photography, said circuitry including: calculation means for calculating a camera-to-object distance for a flash photography based on the light emission quantity data, diaphragm aperture value and film speed value, selector means for selecting either of the diaphragm aperture value and the camera-to-object distance, decoder means for decoding the selected data into data required for a value display and commonly used as a diaphragm aperture value display decoder and as a camera-to-object distance display decoder, and means for displaying the decoded data,

(4) diaphragm aperture value input means for inputting a set or calculated diaphragm aperture value,





(5) film speed input means for inputting a film speed value, and

(6) control means for energizing said circuitry in response to an input of the control signal to said input means.

4,887,120

ELECTRONIC FLASH PHOTOGRAPHING SYSTEM

Mikio Kobayashi, Kanagawa, and Akira Ueno, Tokyo, both of Japan, assignors to Ricoh Company, Ltd., Tokyo, Japan

Filed Feb. 4, 1985, Ser. No. 697,777

Claims priority, application Japan, Feb. 4, 1984, 59-17657; Feb. 4, 1984, 59-17658; Feb. 27, 1984, 59-34292

The portion of the term of this patent subsequent to Oct. 12, 2004, has been disclaimed.

Int. Cl.[4] G03B *15/05*

U.S. Cl. 354—416 **2 Claims**

1. An electronic flash photographing system comprising:

(a) a camera;

(b) a flash unit separate from said camera;

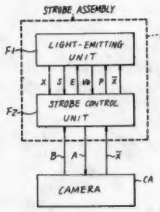
(c) a first signal transmission path for transmitting a signal from said camera to said flash unit; and

(d) a second signal transmission path for transmitting a signal from said flash unit to said camera;

(e) said camera having means for generating and transmitting a timing clock signal to said first signal transmission path and for stopping generation of the timing clock signal or interrupting transmission of the timing clock signal to said first signal transmission path at least when a subject is photographed by said camera, and light control means for detecting the integrated flash light generated by said flash unit and reflected from the subject being photographed and for generating and transmitting a light-emission stop

signal to said first signal transmission path when an integrated value of the detected flash light reaches a preset value;

(f) said flash unit having means for converting a plurality of information signals into a serial signal in synchronism with the timing clock signal from said first signal transmission path, said flash unit being responsive to the light-emission stop signal from said first signal transmission path for stopping light emission; and



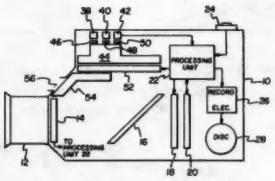
(g) said flash unit having second light control means for detecting and integrating flash light reflected from the subject and generating a light-emission stop signal when an integrated value of the detected flash light reaches a preset value, and light-control selector means for applying the light-emission stop signal to light-emission stop means from said first signal transmission path with priority over the light-emission stop signal from said second light control means, when the timing clock is received from said first signal transmission path.

4,887,121

METHOD AND APPARATUS FOR EXPOSURE CONTROL BASED ON COLOR BALANCE INFORMATION

Jeffrey A. Pritchard, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Dec. 12, 1988, Ser. No. 282,730
Int. Cl.[4] G03B *7/08, 7/097, 7/099;* **H04N** *9/64*
U.S. Cl. 354—430 **13 Claims**



12. An exposure control system comprising:

a. first means for generating a color balance signal;

b. second means for selectively passing portions of received scene light based on said color balance signal; and

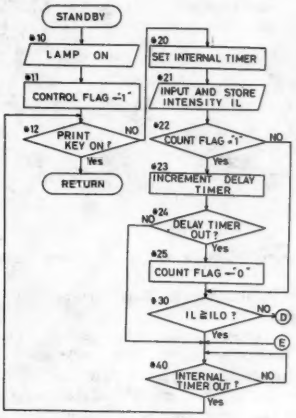
c. third means for measuring said portions of received scene light passed by said second means and determining proper exposure parameters based on said portions of received scene light.

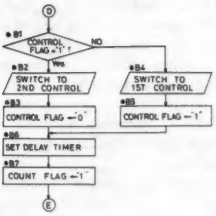
4,887,122

COPYING MACHINE

Takeshi Morikawa, Osaka, Japan, assignor to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed Nov. 4, 1988, Ser. No. 267,446
Claims priority, application Japan, Nov. 4, 1987, 62-278811; Nov. 5, 1987, 62-280195
Int. Cl.[4] G03B *27/52*
U.S. Cl. 355—30 **7 Claims**





1. A copying machine with a fluorescent lamp as its document exposure light source, comprising:

means for commanding a copy start;

exposure scanning means for scanning an original document while exposing the same by illumination of the lamp in response to a command from said copy start command means;

means for detecting the light intensity of said lamp; and

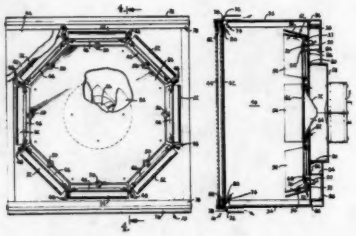
power supply means operable outside a document exposure scanning time and in response to an output of said detecting means for supplying power to said lamp selectively at a first level for increasing a tube wall temperature of the lamp and at a second level for decreasing the tube wall temperature in order to maintain the tube wall temperature constant, said power supply means being also operable, with a decrease in the light intensity detected by said detecting means, for cyclically alternating the power supply to said lamp at the first level and at the second level, a difference between the first level and the second level diminishing with each cycle of alternation.

4,887,123

BOXLIGHT FOR PROJECTION PHOTOREPRODUCTION

Joseph H. Wally, Jr., Shawnee Mission; Herbert W. Pace, and Ronald L. Halsey, both of Lenexa, Kans., assignors to Opti-Copy, Incorporated, Lenexa, Kans.

Filed Sep. 21, 1987, Ser. No. 99,090
Int. Cl.[4] G03B 27/54
U.S. Cl. 355—30 26 Claims



1. Photoreproduction apparatus comprising:
a frame;
a chase on the frame for holding a transparency which is to be projected;
means on the frame for holding photosensitive material onto which the transparency is to be projected to produce a photoreproduction of the transparency;
lens means on the frame between said chase and film holding means for focusing light passing through the transparency on the film, said lens having an optical axis;
a boxlight on the frame providing a compartment having an open side facing toward said chase to direct light from within said compartment toward the chase;
a diffuser on said open side of the boxlight compartment for diffusing light emanating from within said compartment;
lighting means for generating high intensity light in said boxlight compartment from a light source comprising a plurality of elongate high intensity lamps arranged generally end to end to form the general shape of a circle which is substantially centered on said optical axis and contained in a plane oriented substantially perpendicular to said optical axis; and
a reflector for each high intensity lamp, each reflector having a reflective base and a reflective panel located radially outwardly from the lamp at an angular orientation to reflect light from the lamp in a manner to concentrate the reflected light at the marginal areas of the transparency to substantially negate cosine fourth intensity losses at said marginal areas.

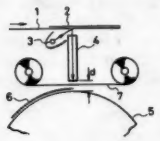
4,887,124

BELT COLOR FILTERS IN AN IMAGE RECORDING APPARATUS

Shigeru Yoshino, Kanagawa, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Apr. 18, 1988, Ser. No. 182,818
Claims priority, application Japan, Apr. 16, 1987, 62-92067
Int. Cl.[4] G03B 27/32, 27/52
U.S. Cl. 355—32 4 Claims

1. An image recording apparatus in which an original is read and recorded on a photo-sensitive material through optical exposure, comprising:
a multi-lens array having a receiving end adjacent an original to be read and a transmitting end adjacent a photo-sensitive material to be recorded;
a belt-shaped color and density correcting film filter provided between said transmitting end of said multi-lens array and said photo-sensitive material, said film filter having a plurality of filter elements of different colors; and



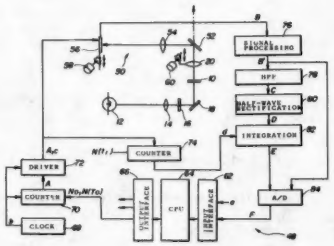
a filter moving mechanism for moving said filter perpendicularly to a transmission path of light through said multi-lens array.

4,887,125

METHOD OF AND DEVICE FOR DETECTING FOCUSING CONDITION OF IMAGE INCIDENT UPON IMAGE SENSOR

Takahiro Hideshima, Kanagawa, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Feb. 16, 1988, Ser. No. 156,516
Claims priority, application Japan, Mar. 5, 1987, 62-48678; Mar. 5, 1987, 62-48679; Mar. 5, 1987, 62-48680
Int. Cl.[4] G03B 27/52, 3/00, 13/18
U.S. Cl. 355—55 33 Claims



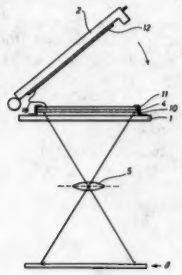
1. A method of detecting focusing conditions of an image incident upon an image sensor, comprising:
(a) the step of reading out projected image informations incident upon said image sensor within an accumulation time period to put out time series output signals for a reading-out period;
(b) the step of filtering said time series output signals to obtain high frequency wave components;
(c) the step of subjecting said high frequency wave components to half-wave rectification to obtain half-wave rectified signals;
(d) the integration step of integrating said half-wave rectified signals after a certain delay from the time when effective output signals corresponding to the effective picture elements begin to be put out; and
(e) the step of utilizing the integrated value of said half-wave rectified signals as a contrast signal to detect the focusing conditions.

4,887,126

REPRODUCTION CAMERA

Finn Hougaard, Copenhagen, Denmark, assignor to Eskofot, Ballerup, Denmark

Filed Apr. 14, 1988, Ser. No. 181,527
Claims priority, application Denmark, Apr. 24, 1987, 2110/87
Int. Cl.[4] G03B 27/62
U.S. Cl. 355—75 7 Claims



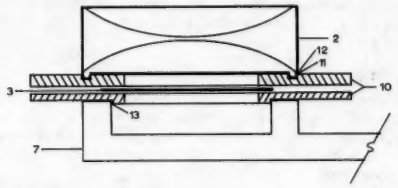
1. A reproduction camera comprising an original plane, an objective plane, and a picture plane, a raster, a film, and a preferably transparent recording sheet being situated on a glass plate in the picture plane, and a rubber cover optionally being situated on the recording sheet during a reproduction, wherein the preferably transparent recording sheet (11) is electrically conductive.

4,887,127

NEGATIVE CARRIER ASSEMBLY FOR OMEGA ENLARGERS

Robert B. Watson, 7720 E. Pierce Pl., Tucson, Ariz. 85710

Filed Feb. 19, 1987, Ser. No. 16,757
Int. Cl.[4] G03B 27/62
U.S. Cl. 355—75 2 Claims



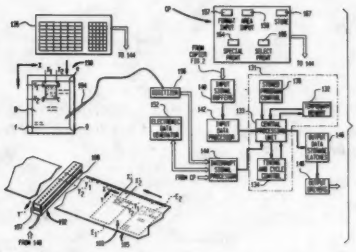
1. An upper light baffle on the top of an enlarger negative carrier assembly comprising, a groove formed in the top surface of said negative carrier, a condenser lens assembly having a lower protruding circumferential portion engaging said groove, whereby light transmitted along the optical path of the enlarger is prohibited from escaping said path thereby improperly exposing light sensitive material and/or adversely effecting exposure measurements.

4,887,128

METHOD AND APPARATUS FOR REPRODUCING DOCUMENTS WITH VARIABLE INFORMATION

Jamal Jamali, Rochester, and Tomas Roztocil, Caledonia, both of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Continuation of Ser. No. 140,709, Jan. 4, 1988, abandoned. This application Mar. 23, 1989, Ser. No. 328,737
Int. Cl.[4] G03G 21/00
U.S. Cl. 355—202 14 Claims



14. An apparatus for producing multiple composite reproductions of an original document sheet in a highly productive reproduction apparatus having an image forming element and wherein the reproductions are to contain additional annotations, the apparatus comprising:

(a) means for selecting a location that is related to an area where the annotation is to be reproduced and generating signals in accordance with such selection;

(b) means, responsive, to said signals, for operating said apparatus to form reproductions of the original with a patch imaged on the area to receive the annotations;

(c) an exposure platen for supporting the patched reproduction;

(d) means for exposing said patched reproduction and for producing multiple composite reproductions of the original document with each reproduction containing information of the original document and additional annotated information, the information of the original document and additional annotated information for each reproduction of the document sheet being formed on one image frame of the image forming element of said apparatus in a composite arrangement.

4,887,129

EDITING COPYING MACHINE

Vittal U. Shenoy, 26 Misty Pine Rd., Fairport, N.Y. 14450; Frank Y. Yang, 40 Woodlyn Way, Penfield, N.Y. 14526, and James R. York, 1457 Loughton Dr., Webster, N.Y. 14580

Continuation of Ser. No. 861,891, May 12, 1986, abandoned. This application May 2, 1988, Ser. No. 188,761
Int. Cl.[4] G03G 15/00, 15/04
U.S. Cl. 355—218 30 Claims

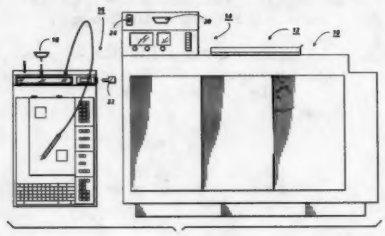
1. An apparatus for producing an altered copy of an original document, including:

means for reproducing copies of an original document;

means, located remotely from said reproducing means and having the original document positioned removably thereon, for changing the information of the original document and generating a signal indicative of the changes in the original document; and

means, mounted removably on said changing means, for storing the signals indicative of the changes in the original document, said storing means being adapted to be mounted removably on said reproducing means to transmit the changes in the original document to said reproduc-

ing means so that when the original document is removed from said changing means and positioned on said repro-



ducing means the copy being reproduced is altered in accordance with the change in information stored in said storing means.

4,887,130

ELECTROSTATIC LATENT IMAGE DEVELOPING APPARATUS

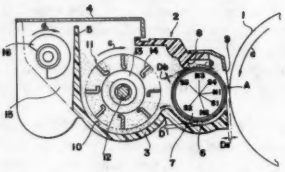
Shizuo Yuge; Kouji Matsushita, both of Toyokawa, and Hidetoshi Kawabata, Toyohashi, all of Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Continuation of Ser. No. 915,571, Oct. 6, 1986, abandoned. This application Aug. 12, 1988, Ser. No. 234,071

Claims priority, application Japan, Oct. 7, 1985, 60-224255

Int. Cl.[4] G03G *15/09*

U.S. Cl. 355—251 **4 Claims**



1. An electrostatic latent image developing apparatus comprising:

a developing sleeve drivingly rotatable for supplying a magnetic developer to the image bearing surface of an electrostatic latent image bearing member;

developer supplying means opposed to the developing sleeve for supplying the developer to the developer carrying surface of the developing sleeve;

a casing provided adjacent to said developing sleeve and extending from a point downstream of a position where the sleeve surface is opposed to the surface of the image bearing member with respect to the direction of rotation of the developing sleeve to a position in the vicinity where the sleeve surface is opposed to the developer supplying means with respect to the direction of rotation of the developing sleeve and defining a gap between the casing and the developing sleeve at said position in the vicinity where the sleeve surface is opposed to the developer supplying means with respect to the direction of rotation of the developing sleeve; and

a magnet fixedly positioned within the developing sleeve and having a plurality of N and S poles spaced around said magnet and each pole extending parallel to the axis of said sleeve, said poles including a first pole opposed to the casing and a second pole having the same polarity as said first pole and positioned adjacent to said first pole at the downstream side thereof with respect to the direction of rotation of the developing sleeve, the magnet having no poles between said first and said first and second poles being spaced sufficiently to leave a portion of said sleeve therebetween where there is substantially no magnetic force in order to form at said first pole the bristle of the developer higher than the size of the gap between the casing and the developing sleeve to seal the gap therebetween.

4,887,131

DEVELOPING APPARATUS USING MAGNETIC PARTICLES AND TONER PARTICLES

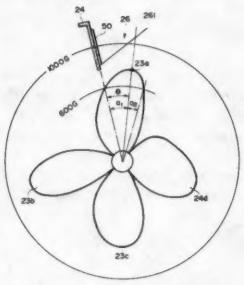
Masahide Kinoshita, Yokohama; Hatsuo Tajima, Matsudo; Norihisa Hoshika, Kawasaki; Hiroshi Tajika, Yokohama, and Atsushi Hosoi, Tokyo, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

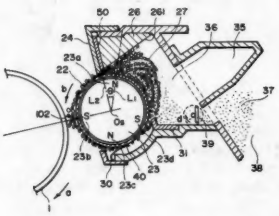
Filed Mar. 15, 1988, Ser. No. 168,517

Claims priority, application Japan, Mar. 16, 1987, 62-060452; Mar. 16, 1987, 62-060460

Int. Cl.[4] G03G *15/09*

U.S. Cl. 355—253 **15 Claims**





1. A developing apparatus for developing an electrostatic latent image on an electrostatic latent image bearing member, comprising:

a container for containing a developer that includes toner particles and magnetic particles;

a developer carrying member, opposed to the electrostatic latent image bearing member, for forming a developing position for supplying the toner particles to the latent image bearing member and for carrying the developer from said container to the developing position;

magnetic field generating field generating means disposed across said developer carrying member from the latent image bearing member for generating a magnetic field;

developer regulating means for regulating the developer that includes the toner particles and carrier particles and which is carried to the developing position;

wherein said magnetic field generating means includes one magnetic pole adjacent an upstream side of said regulating means with respect to a movement direction of said developer carrying member, and wherein said regulating means

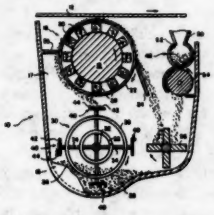
is a magnetic field formed by said one magnetic pole, and wherein a distribution of density of magnetic flux which is provided by said one magnetic pole and which is effective to erect chains of the developer on said developer carrying member is such that the density decreases from its maximum less steeply toward a downstream side than toward an upstream side with respect to the movement direction.

4,887,132

ELECTROGRAPHIC DEVELOPMENT APPARATUS HAVING A RIBBON BLENDER

Brian J. Joseph, Rochester, and Thomas K. Hilbert, Spencerport, both of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Apr. 6, 1984, Ser. No. 597,323
Int. Cl.[4] G03G *15/08*
U.S. Cl. 355—253 **4 Claims**



1. In development apparatus having a sump for a supply of developer material comprising particles and a magnetic brush for providing such material to an electrostatic image carried on an insulating surface, the improvement comprising:

means in the sump for mixing particles of developer material, said mixing means comprising a ribbon blender having a first shaft rotatable about its axis, and the blender having a first spiral ribbon for moving such material in one direction and a second spiral ribbon for moving such material in the opposite direction, said first and second ribbons being spiraled about said shaft and supported from said shaft for rotation therewith; and

means for feeding developer material from the sump to the magnetic brush comprising (a) a second shaft rotatable about its axis, and (b) a plurality of vanes supported by said second shaft in spaced relation to the second shaft, the vanes being located with respect to the ribbon blender and the magnetic brush to pick up developer material mixed by the ribbon blender and deliver such material to the magnetic brush.

4,887,133

PRINTER

Kunihiko Ikeda, Kodaira; Shigeru Suzuki, Yokohama; Takashi Yokota, Tokyo; Akira Shimura, Kawasaki; Yutaka Kodama, Tokyo; Shigeru Yamazaki, Tokyo; Masaichi Niro, Tokyo, and Satoru Tomita, Kawasaki, all of Japan, assignors to Ricoh Company, Ltd., Japan

Continuation of Ser. No. 37,633, Apr. 13, 1987, abandoned, which is a division of Ser. No. 434,701, Oct. 15, 1982, Pat. No. 4,657,372. This application Sep. 13, 1988, Ser. No. 244,584
Claims priority, application Japan, Oct. 16, 1981, 56-165128
Int. Cl.[4] G03G *21/00*; B65H *29/00*
U.S. Cl. 355—321 **9 Claims**

1. A compact, electrophotographic printer comprising:

a housing having a front wall and a rear wall, side walls, a top wall, and a bottom wall, said walls defining an interior space;

a sheet feeder for feeding a sheet in said housing;

sheet moving means defining a sheet moving path for moving a sheet fed from said sheet feeder;

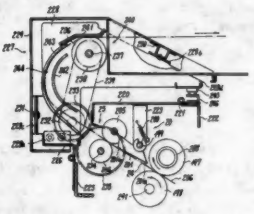
electrophotographic components positioned in said interior space along the sheet moving path;

fixing means disposed at an end of the sheet moving path for fixing an image on the sheet;

a sheet delivery unit for receiving the sheet discharged from a sheet discharging port in said printer and having a delivery port for delivering the sheet on said top wall;

a delivery roller disposed in said delivery port;

guide members for guiding the sheet discharged from the printer to said delivery roller;



delivery roller driving means engageable to a rotating member disposed at said sheet discharging port for rotating said delivery roller; and

a cover which is a portion of said top wall, covering an upper portion of said fixing means, wherein said cover is attached to said printer so as to be openable;

wherein said rotating member disengages from said delivery roller driving means when said cover is opened; and

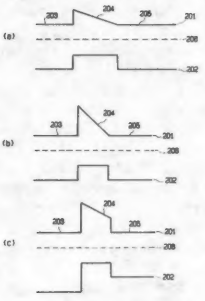
wherein said sheet delivery unit deposits the sheet on said top wall substantially over said electrophotographic components.

4,887,134

SEMICONDUCTOR DEVICE HAVING A SEMICONDUCTOR REGION IN WHICH EITHER THE CONDUCTION OR VALENCE BAND REMAINS FLAT WHILE BANDGAP IS CONTINUOUSLY GRADED

Keishi Saito, Nabari, and Yasushi Fujioka, Ueno, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Sep. 21, 1987, Ser. No. 98,791
Claims priority, application Japan, Sep. 26, 1986, 61-229246
Int. Cl.[4] H01L *29/04, 29/16, 29/70*
U.S. Cl. 357—16 **10 Claims**



1. A semiconductor device comprising a band gap grading semiconductor layer region between a p-type semiconductor layer region comprising a p-type silicon-containing non-single-crystal semiconductor material and an n-type semiconductor layer region comprising an n-type silicon-containing non-sin-

gle-crystal semiconductor material laminated on a substrate, said band gap grading semiconductor layer region forming a junction with said p-type semiconductor layer region and with said n-type semiconductor layer region;

said band gap grading semiconductor layer region comprising a non-single-crystal semiconductor material containing silicon atoms as the main constituent, band gap adjusting atoms and from 1–60 atomic % of hydrogen or halogen atoms as localized level reducing atoms, said band gap grading semiconductor layer region having a region in which a band gap is continuously graded at a position other than said junction; and said band gap grading semiconductor layer region having a conduction band and a valence band, wherein only one of said conduction and valence bands is continuously graded.

4,887,135

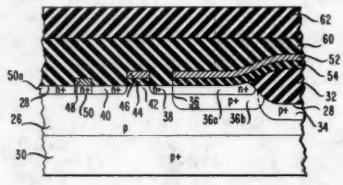
DUAL LEVEL POLYSILICON SINGLE TRANSISTOR-CAPACITOR MEMORY ARRAY

Glen T. Cheney, Allentown, Pa.; Howard C. Kirsch, Colorado Springs, Colo.; James T. Nelson, Coopersburg, Pa., and James H. Stefany, Asbury, N.J., assignors to American Telephone and Telegraph Company, AT&T Bell Laboratories, Murray Hill, N.J.

Continuation of Ser. No. 347,309, Feb. 9, 1982, abandoned. This application Jan. 24, 1985, Ser. No. 694,487

Int. Cl.[4] H01L *29/78, 27/02, 27/10, 29/04*

U.S. Cl. 357—23.6 **6 Claims**



1. A semiconductor memory cell comprising:

a charge storage means having an insulating layer overlying a storage region of a semiconductor body and a first conductor overlying the insulating layer;

an insulated gate field effect transistor coupled to the charge storage means for controlling the flow of charge to or from the charge storage means, with said transistor having localized first and second input/output semiconductor regions of a first conductivity type and separated from one another by a channel of a second conductivity type opposite to said first type, and having a second conductor which is adapted to control the flow of charge through said channel in response to a control signal;

characterized in that

said first and second conductors are essentially separated from one another by the second input/output region, with the first conductor forming a first capacitor plate that is coupled to a portion of a first level conductor, and the second conductor forming a gate electrode that is coupled to a portion of a second level conductor, wherein the second level conductor overlies the first level conductor and is dielectrically spaced therefrom over a portion of said body;

and wherein a surface portion of said storage region is doped with an impurity of said first conductivity type to form a second capacitor plate that contacts said second input/output region.

4,887,136

SEMICONDUCTOR MEMORY DEVICE AND THE METHOD FOR MANUFACTURING THE SAME

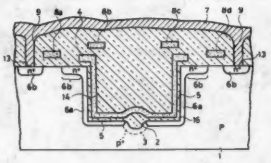
Yoshio Matsuda, and Kazuyasu Fujishima, both of Hyogo, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 20, 1987, Ser. No. 110,462

Claims priority, application Japan, Oct. 20, 1986, 61-250162

Int. Cl.[4] H01L *29/78, 29/06, 27/02*

U.S. Cl. 357—23.6 **11 Claims**



1. A semiconductor memory device, comprising:

a semiconductor substrate of a certain conductivity type and having a main surface, and a trench formed for providing a capacitance for storing charge representing information;

an insulating layer formed on the side walls and the bottom surface of said trench, said insulating layer comprising a thick insulating portion for separation formed in the longitudinal direction and only in the center region of the bottom surface of said trench, whereby said bottom surface of the trench is separated into one lateral half and the other lateral half;

one impurity doped region of an opposite conductivity type formed on the side wall and the bottom surface of one lateral half of said trench and below said insulating layer;

the other impurity doped region of the opposite conductivity type formed on the side wall and on the bottom surface of the other lateral half of said trench and below said insulating layer, said one and the other impurity doped regions are separated by said insulating portion; and

a U-shaped conductive layer formed on the side walls and across the bottom surface of said trench through said insulating layer, said one and the other impurity doped regions sharing said U-shaped conductive layer and including portions of said impurity doped regions on the bottom surface of said trench adjacent said thick insulating portion of said insulating layer together forming separate capacitors for storing charge.

4,887,137

SEMICONDUCTOR MEMORY DEVICE

Masahiro Yoneda; Masahiro Hatanaka; Yoshio Kohno; Shinichi Satoh; Hidekazu Oda, and Koichi Moriizumi, all of Hyogo, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 4, 1988, Ser. No. 170,028

Claims priority, application Japan, Jul. 2, 1987, 62-167165

Int. Cl.[4] H01L *29/78*

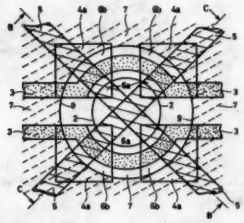
U.S. Cl. 357—23.6 **8 Claims**

1. A semiconductor memory device comprising a semiconductor substrate (**1**),

four memory cells (**4***a*) arranged in point symmetry on said substrate, and

insulating layer (**10**) covering said memory cells and having one contact hole (**2**) placed in the center of the point symmetry, wherein said contact hole enables electrical connection to each of said memory cells, and wherein said contact hole (**2**) comprises a plurality of contact regions

(6a) isolated from each other, said device further comprising one bit line (5) connected to two memory cells



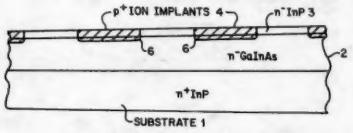
through said contact region(s) and another bit line (5) connected to the remaining two memory cells.

4,887,138

P-I-N PHOTODETECTOR HAVING A BURIED JUNCTION

Peter D. Gardner, Morrisville, Pa., assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Mar. 30, 1988, Ser. No 175,064
Int. Cl.[4] H01L *29/12*
U.S. Cl. 357—30 **4 Claims**



1. In a P-I-N photodetector device having a first upper light transmitting n−InP layer having a low recombination velocity overlaying a second light absorbing layer of n−GaInAs in turn overlaying a substrate of a material selected from the group consisting of n+InP and n+GaAs, the improvement comprising:

at least one p+ ion implant zone formed within said first upper light transmitting n−InP layer having a low recombination velocity which completely penetrates said first upper light transmitting n−InP layer having a low recombination velocity and partially penetrates said second light absorbing layer of n−GaInAs to form a buried junction within said second light absorbing layer of n−GaInAs, said buried junction being unexposed to ambient air.

4,887,139

LINEAR PHOTO SENSING DEVICE

Kenichi Komatsu, Tochigi, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Dec. 17, 1987, Ser. No. 134,061
Claims priority, application Japan, Dec. 18, 1986, 61-299863
Int. Cl.[4] H01L *27/14, 31/00;* H04N *3/14, 5/335*
U.S. Cl. 357—30 **4 Claims**

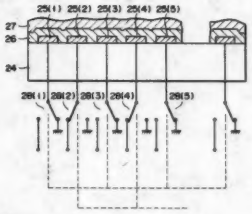
3. A linear photo sensing device comprising:

a first electrode means including a plurality of linearly arrayed electrode elements including first and second groups of electrode elements, each of said plurality of linearly arrayed electrode elements having an output terminal and a ground terminal;

a second linear electrode means;

a linear semiconductor layer having a photoelectric converting function sandwiched between said first and second linear electrode means; and

switching means for connecting in the alternative either the output terminal or the ground terminal to each of the plurality of linearly arrayed electrode elements, the switching means being operative to connect each of the first group of the plurality of electrode elements to each corresponding output terminal and each of the second group of the plurality of electrode elements to each corresponding ground terminal for deriving an effective signal



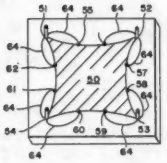
from the first group, and being operative to connect each of the first group of the plurality of electrode elements to each corresponding ground terminal and each of the second group of the plurality of electrode elements to each corresponding output terminal for deriving an effective signal from the second group of the plurality of electrode elements.

4,887,140

CLOVER DESIGN LATERAL EFFECT POSITION-SENSITIVE DEVICE

Wanjun Wang, Austin, Tex., assignor to Board of Regents, The Univ. of Texas System, Austin, Tex.

Filed Apr. 27, 1989, Ser. No. 344,105
Int. Cl.[4] H01L *27/14, 29/06, 23/48;* H01J *40/14*
U.S. Cl. 357—30 **13 Claims**



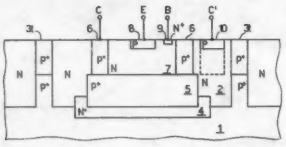
1. A lateral effect position-sensitive device comprising a semiconductor body including a first doped surface-oriented region of one conductivity type, a second doped surface-oriented region of opposite conductivity type, a layer of intrinsic semiconductor material separating said first region and said second region, said first doped region having concave boundaries and at least four vertices, a first plurality of electrical contacts each electrically contacting a vertex, a second plurality of contacts each electrically contacting an intermediate portion of one of said concave boundaries, and means electrically interconnecting each of said second plurality of contacts with one of said first plurality of contacts.

4,887,141

SATURATION LIMITING SYSTEM FOR A VERTICAL, ISOLATED COLLECTOR PNP TRANSISTOR AND MONOLITHICALLY INTEGRATED STRUCTURE THEREOF

Franco Bertotti, Milan; Paolo Ferrari, Gallarate, and Maria T. Gatti, Milan, all of Italy, assignors to SGS-Thomson Microelectronics s.r.l., Brianza, Italy

Filed Oct. 19, 1988, Ser. No. 260,236
Claims priority, application Italy, Oct. 21, 1987, 83666 A/87
Int. Cl.[4] H01L 29/72, 27/02, 27/04
U.S. Cl. 357—36 4 Claims



1. A monolithically integrated vertical PNP transistor with isolated collector formed in a N-type epitaxial layer grown on a monocrystalline silicon substrate and comprising at least a buried P^+-type collector layer contactable from the surface through a P^+-type sinker diffusion completely surrounding a base region of the transistor bounded by said collector buried layer and by said sinker diffusion, a P-type emitter diffusion and an N-type base contact diffusion, both contained within said base region, and an isolation P^+-type diffusion extending through the whole thickness of said epitaxial layer surrounding the entire area occupied by the transistor,

characterized in that

a P or P^+-type diffusion is formed in the epitaxial layer in a zone comprised between said collector sinker diffusion and said isolation diffusion, said P or P^+-type diffusion forming an auxiliary collector region of the integrated transistor;

said auxiliary collector being connectable independently from the collector proper of the transistor to an input terminal of an antisaturation circuit capable of reducing a driving base current of the integrated transistor when, upon the occurence of an excessive saturation of the integrated transistor, said auxiliary collector gathers a portion of a preset value of a total leakage current injected toward the substrate by the saturated PNP transistor.

4,887,142

MONOLITHICALLY INTEGRATED SEMICONDUCTOR DEVICE CONTAINING BIPOLAR JUNCTION TRANSISTORS, CMOS AND DMOS TRANSISTORS AND LOW LEAKAGE DIODES AND A METHOD FOR ITS FABRICATION

Franco Bertotti, Milan; Carlo Cini, Cornaredo; Claudio Contiero, Buccinasco, and Paola Galbiati, Monza, all of Italy, assignors to SGS Microelettronica S.p.A., Italy

Continuation of Ser. No. 6,453, Jan. 23, 1987, abandoned. This application Nov. 28, 1988, Ser. No. 276,890
Claims priority, application Italy, Jan. 30, 1986, 19231 A/86; Jan. 30, 1986, 20779/86[U]
Int. Cl.[4] H01L 27/02
U.S. Cl. 357—43 1 Claim

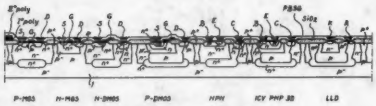
1. An integrated semiconductor circuit formed on a single monolithic substrate of semiconductor material comprising:

a pair of vertical complementary DMOS transistors;

a CMOS transistor structure;

a vertical PNP bipolar junction transistor with isolated collector;

a vertical NPN bipolar junction transistor; and



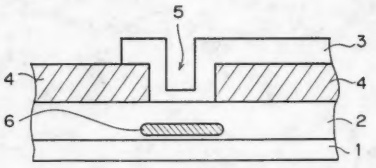
a low leakage integrated diode having a heavily doped surrounding wall region contacting a second heavliy doped bottom anode region.

4,887,143

SEMICONDUCTOR DEVICE

Tatsuo Okamoto, Itami, and Akihiko Ohsaki, both of Itami, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 28, 1988, Ser. No. 174,498
Int. Cl.[4] H01L 27/12, 23/48, 29/167
U.S. Cl. 357—49 6 Claims



1. A semiconductor device comprising:

a first semiconductor layer of first conductivity type;

a second semiconductor layer of second conductivity formed on said first semiconductor layer;

a first insulating layer formed on said second semiconductor layer and having a contact hole in a specified portion thereof;

a conductive layer formed on said first insulating layer and electrically connected to said second semiconductor layer through said contact hole; and

a second insulating layer formed in an internal region of said second semiconductor layer entirely between said first and second semiconductor layers and aligned with said contact hole.

4,887,144

TOPSIDE SUBSTRATE CONTACT IN A TRENCHED SEMICONDUCTOR STRUCTURE AND METHOD OF FABRICATION

Brian E. Cook, Houston, Tex., and Ralph S. Keen, Greensboro, N.C., assignors to Texas Instruments Incorporated, Dallas, Tex.

Continuation of Ser. No. 759,524, Jul. 26, 1985, abandoned. This application Feb. 27, 1987, Ser. No. 21,568
Int. Cl.[4] H01L 27/04
U.S. Cl. 357—50 6 Claims

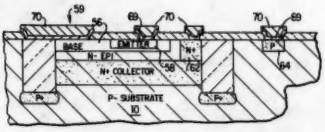
1. A trenched semiconductor structure, comprising:

a silicon substrate of one conductivity type having a concentration of dopant, and a circumferential trench therein extending to a top surface thereof and wherein a top surface of said substrate within the trench is intermediate a bottom of the trench and a top surface of said trench outside of the trench;

a column of isolating dielectric filling said trench to said top surface;

an silicon subcollector region of a second conductivity type formed in a top surface of said substrate within said trench and above a bottom level of said trench;

an epitaxial silicon region of a third conductivity type above said subcollector region, said epitaxial silicon region extending upwardly to a level coplanar with the top surface of said substrate;



a device formed in said silicon epitaxial material region;

ohmic contacts to said device on the top surface thereof and within said trench; and

a further ohmic contact on the top surface of said substrate and to said substrate outside the trench.

4,887,145

SEMICONDUCTOR DEVICE IN WHICH ELECTRODES ARE FORMED IN A SELF-ALIGNED MANNER

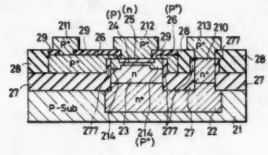
Katsuyoshi Washio, Hachioji; Tohru Nakamura, Tanashi; Kazuo Nakazato, Kokubunji; Masatada Horiuchi, Koganei, and Tetsuya Hayashida, Tokyo, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Dec. 3, 1986, Ser. No. 937,610

Claims priority, application Japan, Dec. 4, 1985, 60-271485; May 30, 1986, 61-123325

Int. Cl.[4] H01L *29/04*

U.S. Cl. 357—59 **40 Claims**



1. A semiconductor device comprising:

a semiconductor substrate;

a first insulating film being formed on the surface of said semiconductor substrate and which has an opening;

a first mesa region of a first single crystalline semiconductor layer being partially provided in said opening, said first mesa region having a top and a side surface wherein a lower portion of said side surface is contiguous with said first insulating film;

a second insulating film being provided on and above said first insulating film and being contiguous with the side surface of said first mesa region;

a second single crystalline or polycrystalline semiconductor layer being provided on said first insulating film adjacent to said second insulating film and having a portion thereof which is in contact with a predetermined peripheral region of the top surface of said first mesa region; and

an insulating layer being provided adjacent to said second single crystalline or polycrystalline semiconductor layer.

4,887,146

SEMICONDUCTOR DEVICE

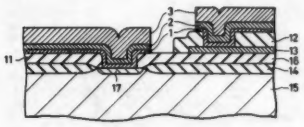
Kenji Hinode, Hachioji, Japan, assignor to Hitachi, Ltd., Tokyo, Japan

Filed May 5, 1987, Ser. No. 46,145

Claims priority, application Japan, May 6, 1986, 61-102010

Int. Cl.[4] H01L *21/283, 23/54*

U.S. Cl. 357—71 **17 Claims**



1. A semiconductor device comprising:

an insulator film having an opening formed on the surface of a semiconductor substrate, said semiconductor substrate being made of silicon;

a TiN_X (x is a value within a range from 0.3 to 0.9) film formed so as to be in contact with the surface of the silicon of said semiconductor substrate through said opening;

a TiN film formed on said TiN_X film; and

a wiring layer formed on said TiN film.

4,887,147

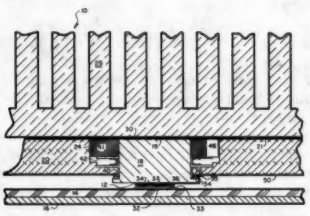
THERMAL PACKAGE FOR ELECTRONIC COMPONENTS

Harvey S. Friedman, Sudbury, Mass., assignor to Digital Equipment Corporation, Maynard, Mass.

Filed Jul. 1, 1987, Ser. No. 69,406

Int. Cl.[4] H01L *23/02, 23/16*

U.S. Cl. 357—74 **17 Claims**



1. An assembly for housing at least one electronic component, said assembly comprising:

a. a printed circuit interconnect substrate which the component is electrically connected thereto;

b. a heat spreader having a bottom surface wherein the electronic component is bonded thereto so as to form a component-and-spreader subassembly, said heat spreader having a spreader top major surface;

c. a support plate spaced away from said printed circuit interconnect substrate, with an exposed major surface, said support plate defining a spreader bore for said heat spreader, said heat spreader disposed in said spreader bore, said support plate dimensioned so that said spreader top major surface protrudes above said support plate exposed major surface;

d. a heat sink attached to said support plate, said heat sink having a major surface adjacent said support plate major surface; and

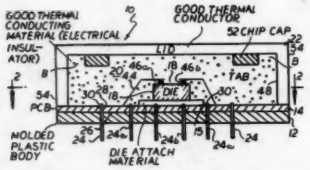
e. a spring fastening means to secure said component-and-spreader subassembly to said support plate and to urge said spreader top major surface against said heat sink major surface.

4,887,148

PIN GRID ARRAY PACKAGE STRUCTURE

Albert T. Mu, San Jose, Calif., assignor to Advanced Micro Devices, Inc., Sunnyvale, Calif.

Filed Jul. 15, 1988, Ser. No. 219,149
Int. Cl.[4] H01L *23/02*
U.S. Cl. 357—74 **16 Claims**



1. A pin grid array package structure comprising:

a package body member (**12**) being formed of a generally diamond-shaped configuration and having top and bottom surfaces;

a plurality of metal terminal pins (**24**) covering substantially the entire top and bottom surfaces of said body member (**12**), said terminal pins (**24**) extending from the bottom surface of said body member (**12**) and protruding slightly above the top surface thereof to form terminal pin ends (**30**);

a wiring board (**14**) being placed over said body member (**12**) for engagement with said terminal pin ends (**30**), said board having a metalized trace pattern deposited on its top surface and having a central portion for receiving a semiconductor chip (**18**);

said wiring board including a lead bond area (**34***a*) of a rectangular shape which is disposed in a spaced apart surrounding relationship with the chip (**18**), said lead bond area (**34***a*) being formed with bonding pads (**42***a*);

a TAB tape lead circuit (**16**) disposed over said chip (**18**) and said wiring board (**14**) for establishing electrical connection between said bonding pads (**34***a*) on said board (**14**) and said die (**18**);

said metalized trace pattern including a plurality of conductor runs (**40**) terminating at its ends with spaced apart metal terminal pads (**36**) which are in substantially vertical alignment with said respective terminal pin ends (**30**);

said plurality of conductor runs being formed of first conductor runs (**40***b*) extending outwardly from the bonding pads (**42***a*) on the lead bond area (**34***a*) and alternating second conductor runs (**40***b*) extending inwardly from the bonding pads (**42***a*) on the lead bond area (**34***a*); and

cover means for enclosing said body member (**12**), tape lead circuit (**16**), die (**18**), and board **914**) to prevent exposure to atmospheric environment.

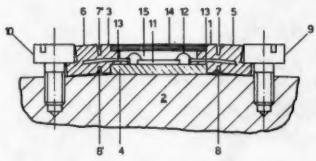
4,887,149

SEMICONDUCTOR DEVICE MOUNTED IN A HIGHLY FLEXIBLE, SEGMENTED PACKAGE, PROVIDED WITH HEAT SINK

Luigi Romano', Monza, Italy, assignor to SGS Microelectronica S.p.A., Catania, Italy

Filed Jul. 14, 1987, Ser. No. 72,924
Claims priority, application Italy, Jul. 17, 1986, 83632 A/86
Int. Cl.[4] H01L *23/30, 23/28, 23/34*
U.S. Cl. 357—81 **5 Claims**

1. A semiconductor device comprising essentially a chip of semiconductor material mounted on the surface of a heat sink metal body having two major surfaces parallel each other, a plurality of pins suitably connected by means of connecting wires to respective connecting areas on the surface of said semiconductor ship, a substantially parallelepiped body of resin having two major surfaces encapsulating said chip, said connecting wires, said pins, with the exception of their free end, and embedding on one of said major surfaces said heat sink metal body and means for fastening the device to an external supporting heat sink, wherein said resin body extends beyond the perimeter of said major surfaces of said metal body from two diametrically opposite sides of said perimeter forming two side segments of said parallelepiped body of resin; means for fastening the device being present in each of said



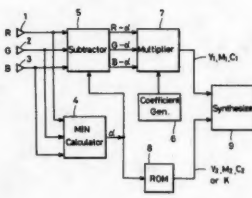
side segments of said resin body; at least a pair of opposite grooves formed on both major surfaces of said resin body separating said side segments containing said fastening means from a central segment of said parallel piped body of resin embedding said metal body, providing a flection zone and mechanically de-coupling said side segments of the resin body from said metal body.

4,887,150

DEVICE FOR CONVERTING VIDEO IMAGE SIGNALS TO PRINTING DATA SIGNALS

Kazuhiro Chiba, and Noriko Bamba, both of Nagaokakyo, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 16, 1988, Ser. No. 168,942
Claims priority, application Japan, Mar. 16, 1987, 62-60520; Aug. 17, 1987, 62-203768; Oct. 21, 1987, 62-267163; Oct. 21, 1987, 62-267165; Oct. 23, 1987, 62-268905
Int. Cl.[4] H04N *1/46*
U.S. Cl. 358—80 **15 Claims**



1. A color converting device for converting R, G and B image signals representing red, green and blue colors, respectively, into three color printing data indicative of the colors yellow, magenta and cyan, which device comprises:

first dividing means for dividing the image signals into achromatic and chromatic color components for each picture element;

first converting means for converting the chromatic color components so divided into first color conversion data Y1, M1 and C1 representative of the colors yellow, magenta and cyan, respectively;

second converting means for converting the achromatic color component into second color conversion data Y2, M2 and C2;

adder means for summing the first and second color conversion data Y1, M1, C1, Y2, M2 and C2 together to provide said three color printing data;

wherein said first dividing means further comprises,

detecting means for detecting one of the R, G and B image signals which is of a minimum value for each picture

element and for extracting the minimum value as an achromatic color component α and for outputting an identifying signal a indicative of the image signal of said minimum value, and

extracting means for subtracting the achromatic color component α from each of the R, G and B image signals and for extracting the differences R−α, G−α and B−α as red, green and blue color components of such image signals; and

wherein said first converting means further comprises, matrix generating means for generating a color conversion coefficient matrix defined for each region of yellow, magenta and cyan in response to said identifying signal a so that optimum color reproducibility can be attained, and

means for selecting the color conversion coefficient matrices for the regions to which the color component to be converted belongs and for subsequently converting into the first color conversion data Y1, M1 and C1 by means of a calculation utilizing the selected color conversion coefficient matrices.

4,887,151

ENCODING APPARATUS FOR COLOR IMAGE DATA WITH BLOCK-BY-BLOCK INDIVIDUAL QUANTIZING OR INDIVIDUAL ENCODING OF LUMINOSITY, STRUCTURE, AND COLOR INFORMATION

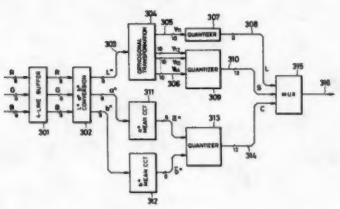
Masafumi Wataya, Tokyo, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 66,119, Jun. 25, 1987, abandoned. This application Apr. 19, 1989, Ser. No. 342,583

Claims priority, application Japan, Jun. 30, 1986, 61-152958; Jan. 28, 1987, 62-159434; Jan. 28, 1987, 62-159444

Int. Cl.[4] G03F *3/08*; H04N *1/46*

U.S. Cl. 358—80 **17 Claims**



1. A color image data encoding apparatus comprising:

dividing means for dividing color image data into blocks;

extraction means for extracting luminosity information relating to the light level of each block, structure information relating to the structure of each block, and color information relating to the color of each block; and

encoding means for encoding said color image data, said encoding means individually encoding the luminosity information, the structure information and the color information thus extracted.

4,887,152

MESSAGE DELIVERY SYSTEM OPERABLE IN AN OVERRIDE MODE UPON RECEPTION OF A COMMAND SIGNAL

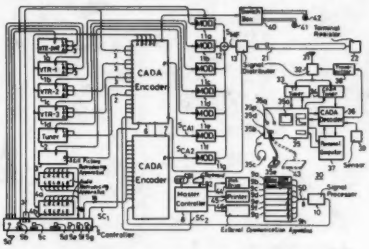
Atsushi Matsuzaki; Hiroyuki Kobayashi, both of Kanagawa; Hideo Tomita, Chiba; Kenichi Kikuchi, Tokyo; Kenji Inoue; Yoshiyuki Kondo, both of Tokyo; Masatoshi Hirayasu, Kanagawa, and Atsushi Ichise, Tokyo, all of Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Jan. 26, 1988, Ser. No. 148,695

Claims priority, application Japan, Jan. 30, 1987, 62-19982; Feb. 2, 1987, 62-22071; Feb. 25, 1987, 62-42305

Int. Cl.[4] H04N *5/00, 7/18*; H04B *3/50*

U.S. Cl. 358—86 **31 Claims**



1. A message delivery system, comprising:

(a) a head end apparatus comprising means for reproducing video programs, means for reproducing audio programs, means for reproducing messages, controller means having key means for generating a command signal for said messages, modulator means for modulating said video programs, said messages, and said audio programs and said command signal in different frequency bands, respectively, and multiplexer means for multiplexing said modulated video programs, said modulated messages, said modulated audio programs and said modulated command signal;

(b) a plurality of terminal units each comprising a means for selecting desired ones of said multiplexed, modulated video programs and audio programs, tuner means coupled to the selecting means for receiving and demodulating said modulated messages, said selected modulated video programs, said selected modulated audio programs, and said modulated command signal, a means for receiving the demodulated command signal and generating in response to the demodulated command signal an override signal for forcing the tuner means to select the frequency band of said modulated messages, a display means for displaying the demodulated selected video programs, an audio output terminal for receiving the demodulated selected audio programs, and a volume control for controlling the amplitude of the demodulated selected audio programs received by the audio output terminal; and

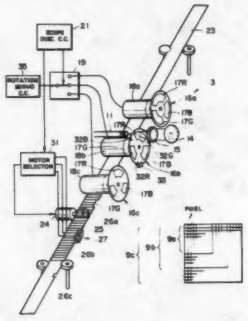
(c) means for transmitting said video programs, said messages, said audio programs and said command signal from said head end apparatus to the terminal units.

4,887,153

ELECTRONIC ENDOSCOPE APPARATUS USING HORIZONTAL TRANSFER CLOCK OF FIXED FREQUENCY

Masao Uehara; Masahiko Sasaki; Masahide Kanno, all of Hachioji; Jun Hasegawa, Hino; Shinji Yamashita, and Katsuyoshi Sasagawa, both of Hachioji, all of Japan, assignors to Olympus Optical Co., Ltd., Tokyo, Japan

Division of Ser. No. 134,627, Dec. 16, 1987, Pat. No. 4,816,909.
This application Sep. 8, 1988, Ser. No. 241,729
Int. Cl.[4] A61B *1/04*; H04N *7/18*
U.S. Cl. 358—98 **30 Claims**



1. An endoscope apparatus comprising:

first and second endoscopes respectively including first and second long inserted portions, first and second light emitting means for respectively emitting light from the forward ends of said first and second inserted portions, first and second objective lens systems respectively disposed at the forward ends of said first and second inserted portions for forming the image of an object, and first and second solid-state image elements for respectively converting the images formed by said first and second objective lens systems to electrical signals, said first and second solid-state image elements containing a different number of pixels;

a drive signal generating means for outputting to said first or second solid-state image element a drive signal including a horizontal transfer clock of fixed frequency even when said first and second solid-state image elements have a different number of pixels; and

a video signal processing means for processing a signal read out from said first or second solid-state image element by the application of said drive signal so as to generate a predetermined video signal and for outputting said video signal to a monitor means for visual display.

4,887,154

LAMP ASSEMBLY AND RECEPTACLE

Thaddeus J. Wawro, Auburn; Stanley R. English, Elbridge, and Dominick Danna, Syracuse, all of N.Y., assignors to Welch Allyn, Inc., Skaneateles Falls, N.Y.

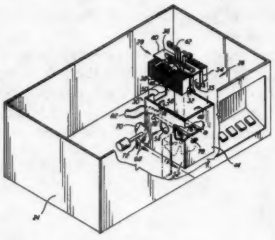
Filed Jun. 1, 1988, Ser. No. 201,062
Int. Cl.[4] H04N *7/18*; A61B *1/06*
U.S. Cl. 358—98 **14 Claims**

1. A video system having, a video processor mounted to a frame; a viewing probe coupled to the video processor that has an imaging device at its distal end; and an illumination apparatus coupled to the viewing probe; said illumination apparatus including:

a lamp assembly containing, a light source having first and second electrodes for illuminating a target in the viewing range of the imaging device of the viewing probe, and heat disposing means, thermally coupled to said light source for disposing heat energy generated by said light source, said heat disposing means being arranged to support said light source,

said heat disposing means having first and second heat sink members, each of said members being electrically conducting and one being electrically insulated from the other, said first and said second heat sink members being electrically coupled to the first and the second electrodes respectively of said light source;

housing means having front and rear walls and containing an opening configured and dimensioned to permit the insertion of said lamp assembly therein, for housing said lamp assembly;



a receptacle disposed within and supported by said housing means having first and second electrical conductors;

plug means connected to said first and said second heat sink members for detachably coupling said first and said second heat sink members to the first and the second conductors of said receptacle respectively upon the insertion of said lamp assembly into said housing means;

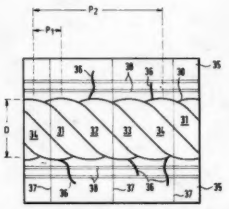
whereby said light source is actuated upon application of a power supply to the first and the second electrical conductors of said receptacle.

4,887,155

METHOD AND ARRANGEMENT FOR MEASURING AND/OR MONITORING PROPERTIES OF YARNS OR ROPES

Robert Massen, Kämpfenstrasse 39, 7760 Radolfzell, Fed. Rep. of Germany

Filed Dec. 4, 1987, Ser. No. 128,715
Claims priority, application Fed. Rep. of Germany, Dec. 6, 1986, 3641816
Int. Cl.[4] H04N *7/18*
U.S. Cl. 358—107 **21 Claims**



1. A method of measuring and/or monitoring properties of a yarn or rope comprising the steps of:

(a) taking a two-dimensional image of a portion of the yarn or rope using an image sensor which converts the image to electrical image signals;

(b) digitizing the image signals to provide digital image signals each of which corresponds to an image point of the image;

(c) storing the digital image signals in an image signal memory for which each image point of the two-dimensional image has a memory location at which the complete digital image signal of the respective image point can be stored; and

(d) determining the number of twists per unit length or the length of a twist of the yarn or rope from the stored digital image signals using a calculating unit by determining the period of the structure of the yarn or rope in an evaluation direction which is parallel to the longitudinal direction of the yarn or rope.

4,887,156

METHOD AND SYSTEM FOR TRANSFORM CODING OF VIDEO SIGNALS

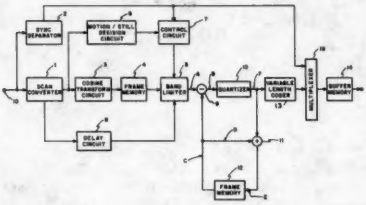
Junichi Ohki, Tokyo, Japan, assignor to NEC Corporation, Japan

Filed Apr. 28, 1988, Ser. No. 187,380

Claims priority, application Japan, Apr. 30, 1987, 62-108258

Int. Cl.[4] H04N *7/133, 7/137*

U.S. Cl. 358—133 **3 Claims**



1. A method of coding a video signal by using transform coding, comprising the step of:

limiting a signal produced by transform coding to a predetermined band depending upon a ratio of a motion area and a still area within a video signal frame.

4,887,157

METHOD AND APPARATUS FOR IMPROVING THE RESOLUTION OF DIGITAL SIGNALS

Wolfgang Hartnack, Hemmingen, and Herbert Schütze, Hanover, both of Fed. Rep. of Germany, assignors to Deutsche Thomson-Brandt GmbH, Hanover, Fed. Rep. of Germany

Filed Aug. 15, 1988, Ser. No. 232,221

Claims priority, application Fed. Rep. of Germany, Aug. 21, 1987, 3727874

Int. Cl.[4] H04N *7/133*

U.S. Cl. 358—133 **7 Claims**

LUMINANCE	107	107	108	108	108	109	109	109
TRANSFORMED	865	-6	0	0	0	0	0	0
	%8							
REDUCED PLACE TRANSFORMED	108	0	0	0	0	0	0	0
INVERSE TRANSFORMED LUMINANCE	108	108	100	108	108	108	108	108

1. In a method for improving the resolution of digital signals whose values vary over an initial range, in particular luminance and/or chrominance TV signals, which method includes: directly transforming the digital signal values in blocks in such a manner as to create, for each block, one coefficient representing a uniform component and several coefficients representing alternate components, limiting each coefficient to a reduced range of values and rounding off each coefficient; and subsequently inversely transforming the coefficients, the improvement wherein said step of directly transforming comprises increasing the precision of the coefficients representing alternate values below a selected magnitude prior to said step of rounding off.

4,887,158

SOUND AND IMAGE TRANSMISSION SYSTEM

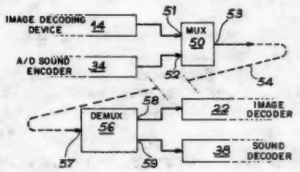
Jacques Guichard, 8 rue des Morillons, 75015 Paris, and Gerard Eude, 26 Allée Jean Bart, 77200 Torcy, both of France

Filed Oct. 12, 1988, Ser. No. 256,612

Claims priority, application France, Oct. 12, 1987, 87 14043

Int. Cl.[4] H04N *7/04*

U.S. Cl. 358—143 **6 Claims**



1. The image and sound transmission system which includes:

(A) a transmission system comprising:

(a) an image transmission unit including a device (10) for capturing images, a pre-buffer memory (12), which is written upon with a picture signal at a certain frequency (F), read at a frequency (F/N), (N) being an image speed reduction factor and emits a signal corresponding to one picture among (N) pictures, an image coding device (14) which includes an encoder (16) and a buffer memory (18), and this device (14) emits an encoded digital picture signal, and

(b) a sound transmission unit including a sound input device (32) and a sound processing unit (34), which emits a digital sound signal;

(B) means (20,36) for the transmission of the digital picture signal and the digital sound signal; and

(C) a receiving unit comprising

(a) an image decoding device (22), which receives the encoded digital signal transmitted and which includes a decoder (24) and a buffer memory (26), and emits a decoded picture signal at a frequency (F/N), a device (28) for retransmitting the decoded picture signal N times, and a picture display medium (30) which reconstructs the sequences of N identical images, and

(b) sound processing means which include a sound decoder (38) and a sound restitution device (40), and wherein:

(A) in the transmission system:

(a) the pre-buffer memory (12), the encoder (16) and the buffer memory (18) of the image transmission unit operate only during a fraction (Ti/T) of the (total operating) time and T/Ti times faster than if they operated continuously, T being the length of an encoded image, with this unit emitting a digital signal with an output of Di kbits/s and with a length of Ti,

(b) the sound processing unit (34) emits a digital sound signal during only a fraction (Ts/T) of the (total operating) time, with an output of LDs kbits/s, and

(c) there is, in addition, a multiplexer (50) with two inputs, one input (51) being connected to the output of the coding device (14), and the other input (52) being connected to the output of the sound processing unit (34), this multiplexer (50) having an output (53) which emits a signal made up of sequences with the time interval (T), each sequence having first a picture signal with a length

of Ti, then a sound signal with a length of Ts, with T=Ti+Ts;

(B) the transmission means are made up of a single transmission line (54) connected to the multiplexer output, this single line having an output (D) equal to the sum of the outputs; and

(C) in its receiving unit:

(a) there is a demultiplexer (56) with an input (57) connected to the single transmission line (54) and to two outputs (58,59), the first of which emits a digital picture image with a length of Ti and an output of Di, and the second of which emits a digital sound signal with a length of Ts and an output of Ds,

(b) the image decoding device (22) is connected to the first demultiplexer output (58) and to its decoder (24), which only operates during a fraction (Ti/T) of the (total operating) time, with the Ti being the length of the picture signal, and

(c) the sound processing means are connected to the second demultiplexer output (59) and only operate during a fraction (Ts/T) of the (total operating) time, with Ts being the length of the sound signal.

4,887,159

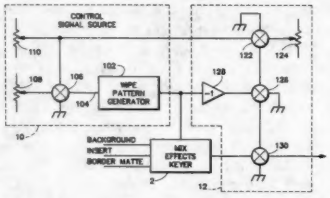
SHADOW VISUAL EFFECTS WIPE GENERATOR

Daniel J. Chaplin, Nevada City, Calif., assignor to The Grass Valley Group Inc., Nevada City, Calif.

Continuation of Ser. No. 203,602, Jun. 2, 1988, abandoned, which is a continuation of Ser. No. 30,937, Mar. 26, 1987, abandoned. This application Mar. 14, 1989, Ser. No. 323,057

Int. Cl.[4] H04N 5/22

U.S. Cl. 358—183 **6 Claims**



1. An improved wipe generator of the type having means for generating mix control signals and means for combining video signals under control of the mix control signals to produce an output video signal, wherein the improvement comprises:

means for generating a visual quality control signal in response to the mix control signals and a transition signal from the mix control signals generating means; and

means for combining the visual quality control signal with one of the video signals so that a visual quality of the one video signal in the output video signal is adjusted to produce a visual effect output video signal.

4,887,160

IMAGE-PICKUP DEVICE AND SYSTEM CAPABLE OF OUTPUTTING EITHER COMBINED (HIGH BAND) OR SEPARATE (LOW BAND) SIGNALS

Takao Kinoshita, Tokyo, and Akihiko Tojo, Yokohama, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 877,851, Jun. 24, 1986, abandoned. This application Jun. 9, 1989, Ser. No. 364,501

Claims priority, application Japan, Jul. 8, 1985, 60-149478

Int. Cl.[4] H04N 3/14

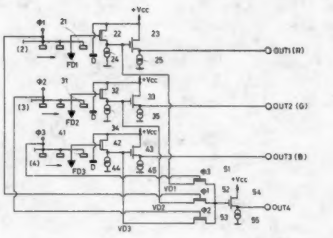
U.S. Cl. 358—213.26 **8 Claims**

1. An image pickup device comprising:

(A) a plurality of radiation sensitive cells each formed in or on a semi-conductive body and each for generating an electrical signal in response to received radiation, said cells being divided into plural groups;

(B) first read-out means formed in or on said semi-conductive body responsive to control signals for separately reading out from the semi-conductive body the signals from the respective groups of said cells wherein said first read-out means includes plural read-out channels respectively corresponding to said radiation sensitive cell groups, each read-out channel being driven by a different control signal, each channel including a control electrode;

(C) second read-out means formed in or on said semi-conductive body and responsive to said control signals for alternately reading out the signals from said plural groups,



wherein said second read-out means has selection switches, each having a control electrode, one common output and individual inputs of said selection switches being respectively connected to outputs of said read-out channels; and

(D) control signal path means for supplying said control signals both to said first and to said second read-out means, wherein said signal path means includes plural control signal paths formed in or on said semi-conductive body and each connected to one of the control electrodes of said read-out channels and to one of the control electrodes of said selection switches for simultaneously supplying one of said control signals.

4,887,161

MEMORY CARTRIDGE AND DIGITAL ELECTRONIC STILL VIDEO CAMERA IN WHICH SAID MEMORY CARTRIDGE IS FREELY LOADABLE/UNLOADABLE

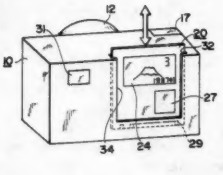
Mikio Watanabe, Tokyo; Koji Shimanuki, Isehara, and Seiki Nishi, Tokyo, all of Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed May 27, 1988, Ser. No. 199,705

Claims priority, application Japan, May 28, 1987, 62-129932; May 28, 1987, 62-129933; May 28, 1987, 62-129934

Int. Cl.[4] H04N 5/76

U.S. Cl. 358—224 **8 Claims**



1. An apparatus for storing and displaying an image, comprising:

a digital still video camera for developing digital video signals representative of the image; and

a cartridge for storing and displaying said digital video signals of the image including,

connection means for selectively connecting said cartridge to said digital still video camera,

memory means for storing said digital video signals of the image received through said connection means,

converting means for converting said digital video signals of the image from said memory means to analog video signals,

display means for displaying the image responsive to said analog video signals, and

power means for supplying power to said cartridge.

4,887,162
FACSIMILE MACHINE HAVING RETRANSMISSION FUNCTION

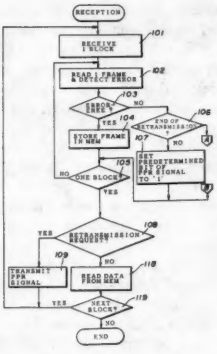
Yoshihiro Arai, Hiratsuka, Japan, assignor to Ricoh Company, Ltd., Tokyo, Japan

Filed Apr. 10, 1989, Ser. No. 335,953

Claims priority, application Japan, Apr. 19, 1988, 63-94412; Aug. 5, 1988, 63-194620; Aug. 15, 1988, 63-201958; Dec. 13, 1988, 63-312808; Jan. 11, 1989, 64-2772

Int. Cl.[4] H04N *1/00*

U.S. Cl. 358—400 **23 Claims**



1. A facsimile machine comprising:

modem means coupled to a data transmission path for modulating a transmitting image data which is transmitted to the data transmission path and for demodulating received image data which is received from the data transmission path, said transmitting image data and said received image data being transmitted and received in frames respectively including image data related to a plurality of lines and error correction codes for use in detecting an error in the image data of each of the lines;

communication control means coupled to said modem means for controlling communications to and from the data transmission path;

reading means for reading a document image which is to be transmitted and for outputting the transmitting image data describing the document image;

recording means for recording an image described by the received image data onto a recording sheet;

memory means for temporarily storing the transmitting image data and the received image data; and

system control means for controlling operations of said communication control means, said reading means and said recording means,

said system control means including first error detecting means for detecting an error in the received image data related to an arbitrary frame by detecting the error correction code, discriminating means for discriminating whether or not a retransmission request of said arbitrary frame is permitted, retransmission means for controlling said communication control means to output a retransmission request only when said discriminating means discriminates that the retransmission request is permitted, second error detecting means for detecting whether or not a data error exists in the image data related to the lines within said arbitrary frame for each of the lines within said arbitrary frame when said discriminating means discriminates that the retransmission is not permitted, and enabling means for enabling said recording means to record the image data related to each of the lines in which no data error is detected in said second error detecting means, so that the image data related to said arbitrary frame is recorded on said recording means even when an error is detected therein.

4,887,163
IMAGE PROCESSING APPARATUS

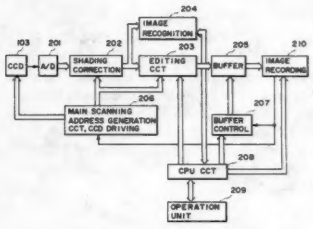
Katsuyoshi Maeshima, Yokohama, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Division of Ser. No. 82,660, Aug. 7, 1987, abandoned. This application Mar. 20, 1989, Ser. No. 325,104

Claims priority, application Japan, Aug. 14, 1986, 61-191483; Aug. 14, 1986, 61-191484

Int. Cl.[4] H04N *1/40*

U.S. Cl. 358—443 **21 Claims**



1. An image processing apparatus comprising:

input means for entering image data representing each of plural pixels;

means for forming processing data of a plurality of bits corresponding to each pixel or consecutive plural pixels of the image data entered by said input means, the processing data including plural editing data each comprising at least one bit representing mutually different image process conditions; and

process means for processing, pixel by pixel, the image data entered from said input means, based on the processing data formed by said forming means, said process means performing mutually different image processings on the image data in accordance with said plural editing data each comprising at least one bit, respectively.

4,887,164
IMAGE DATA COMMUNICATION APPARATUS HAVING AN IMAGE DATA MEMORY

Masamoto Takahashi, Tokyo, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Sep. 1, 1988, Ser. No. 239,314

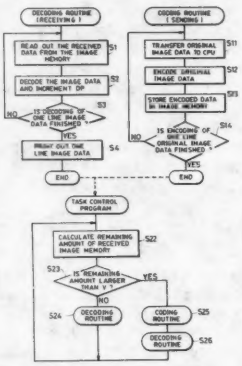
Claims priority, application Japan, Sep. 16, 1987, 62-229667

Int. Cl.[4] H04N *1/40*

U.S. Cl. 358—443 **25 Claims**

1. An image data communication apparatus comprising communication means for performing at least one of an image data sending operation and an image data receiving operation; an image memory for storing image data communicated by said communication means; a program memory for storing a

plurality of programs including a first program, which controls an operation of said communication means using said image memory, and a second program which is different from the



first program; and, a control processor for processing both the first program and the second program in a time sharing control sequence.

4,887,165

DOCUMENT EDITING APPARATUS HAVING DETACHABLE IMAGE READER

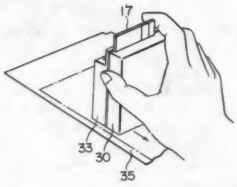
Tomio Sato, Takahagi; Shigeru Matsuoka, Hitachi; Eiji Matsuda, Takahagi, and Hitoshi Yonenaga, Hitachi, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed May 20, 1988, Ser. No. 196,260

Claims priority, application Japan, May 25, 1987, 62-125885

Int. Cl.[4] H04N *1/04*

U.S. Cl. 358—474 **6 Claims**



6. A document editing apparatus comprising an apparatus body including means for displaying image data, an editing keyboard, means for storing image data, a general control unit for controlling said displaying means, said keyboard, and said storing means in response to instruction inputs applied from said keyboard; an image reader disposed separately from said apparatus body so as to be freely movable over an original document; and a detachable signal cable for detachably connecting said image reader to said apparatus body,

said image reader including:

movement detecting means for providing a synchronizing signal indicative of movement of said image reader over the original document;

an image sensor for photoelectrically converting characters and patterns drawn on the original document into image data in accordance with the synchronizing signal;

buffer memory means for temporarily storing image data produced on the basis of an output from said image sensor;

memory connecting means adapted to detachably receive an externally inserted, card-type semiconductor memory integrated circuit package to connect the package to said image reader;

package detachment detecting means for detecting whether a semiconductor memory integrated circuit package is connected to said memory connecting means;

selector switch means for selecting image data to be stored in a semiconductor memory integrated circuit package connected to said memory connecting means;

memory status indicating means for indicating the status of available memory space in a semiconductor memory integrated circuit package connected to said memory connecting means;

abnormal reading indicating means for indicating abnormal reading; and

a control circuit connected to said memory connecting means, said package detachment detecting means, said selector switch means, said memory status indicating means and said abnormal reading indicating means and including means for temporarily storing the image data in said buffer memory means; means for monitoring the synchronizing signal to decide whether a reading operation is normal or abnormal; means for actuating said abnormal reading indicating means when the reading operation is abnormal; means for confirming whether a semiconductor memory integrated circuit package is connected to said memory connecting means on the basis of an output signal from said package detachment detecting means, when the reading operation is normal, and the selected image data is to be stored in said semiconductor memory integrated circuit package; means for comparing, when the connection is confirmed, the residual memory capacity of the connected semiconductor memory integrated circuit package with the quantity of image data to be stored; and means for actuating said memory status indicating means for indicate an abnormal status when no semiconductor memory integrated circuit package is connected to said memory connecting means or when the residual memory capacity of the connected semiconductor memory integrated circuit package is insufficient for storing the image data to be stored; and means for transferring the image data temporarily stored in said buffer memory means to the connected semiconductor memory integrated circuit package to store the image data in the connected package when the residual memory capacity of the connected package is sufficient for storing the image data.

4,887,166

DIRECT-CONTACT-TYPE IMAGE SENSOR

Hiroaki Kakinuma; Yukio Kasuya; Masaaki Sakamoto; Tsukasa Watanabe, and Mikio Mouri, all of Tokyo, Japan, assignors to Oki Electric Industry Co., Ltd., Tokyo, Japan

Filed May 20, 1988, Ser. No. 197,449

Claims priority, application Japan, May 22, 1987, 62-123691; Jul. 22, 1987, 62-112386[U]; Nov. 6, 1987, 62-279287; Nov. 27, 1987, 62-297488

Int. Cl.[4] H04N *3/14, 1/024*

U.S. Cl. 358—471 **11 Claims**

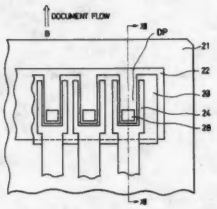
1. A contact-type image sensor comprising an array of photosensor elements for receiving light reflected from a document,

a protective layer disposed over said array of photosensor elements for protecting said array of photosensor elements when contact is made with said document, and

means for discharging electric charges accumulated on said protective layer whereby electric charges generated by friction between said protection layer and said document is discharged by said discharging means,

wherein at least that portion of said protective layer that

makes contact with said document is made of a material with a resistivity of 10^{14} ohm·cm or less, and is connected



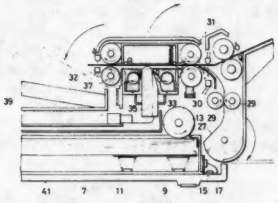
to a common electrode of said photosensor array to act also as said discharging means.

4,887,167

RECORDING APPARATUS

Kunihiko Miura, Hiratsuka, Japan, assignor to Kabushiki Kaisha Toshiba, Kanagawa, Japan

Filed Jan. 20, 1987, Ser. No. 5,411
Claims priority, application Japan, Jan. 22, 1986, 61-9839
Int. Cl.[4] G01D *15/10*
U.S. Cl. 358—296 **7 Claims**



1. A recording apparatus, comprising:

printing means having a plurality of printing dots for printing data on a member to be recorded;

a plurality of buffers, each operative to and having a capacity for storing a first predetermined amount of the printing data corresponding to a first plurality of scanning lines of the printing dots of said printing means, and operative to store a second predetermined amount of the printing data corresponding to a second plurality of scanning lines different than said first plurality of scanning lines; and

recording control means governed by the amount of data stored in the plurality of buffers for controlling said printing means to print the printing data in accordance with a first operating characteristic at times when the first predetermined amount of printing data is stored in the plurality of buffers and in accordance with a second operating characteristic different from the first operating characteristic at times when the second predetermined amount of data is stored in the plurality of buffers.

4,887,168

THERMALLY OPERATED APPARATUS FOR MAKING A PLATE

Toshio Endo, Shiroishi, and Mitsuo Sato, Shibata, both of Japan, assignors to Ricoh Company, Ltd., Tokyo, Japan

Filed Dec. 18, 1987, Ser. No. 135,081
Claims priority, application Japan, Dec. 20, 1986, 61-304844
Int. Cl.[4] G01D *15/10*; H04N *1/23*
U.S. Cl. 358—299 **12 Claims**

1. A thermally operated apparatus for making a plate comprising:

transporting means positioned to allow an original document to be fed on and along a glass platen;

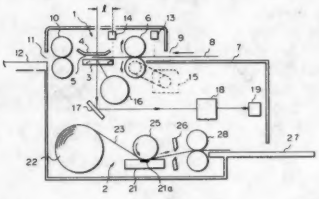
reading means for reading said document being transported by said transporting means;

sensing means for sensing said document which is read by said reading means and producing a sense signal;

a thermal head for engraving an image of said original document in a stencil;

a stencil transport roller rotatable for transporting said stencil while urging said stencil againts said thermal head;

setting means for setting the number of delimited fields which are to be defined in a plate making area of said stencil side by side in an intended direction of stencil transport so as to produce a plate by a continuous operation, and producing a set signal;



control means for controlling said stencil transport roller such that when said sense signal and said set signal are inputted, whether said plate making area of said stencil is long enough to accommodate said plurality of fields is decided and, if the result of said decision is positive, rotation of said stencil transport roller is temporarily stopped until said document has been discharged by said transporting means to become ready to be fed again and, if the result of said decision is negative, rotation of said stencil feed roller is not stopped; and

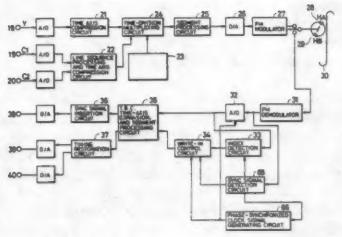
means for cutting said transported stencil at a predetermined length in response to the completion of the formation of an image on said stencil.

4,887,169

VIDEO SIGNAL RECORDING AND PLAYBACK APPARATUS HAVING VARIED-SPEED PLAYBACK CAPABILITY

Tatsushi Bannai; Shigeru Awamoto; Mitsuo Chiba, all of Osaka, and Seishi Sasaki, Kobe, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Apr. 3, 1987, Ser. No. 33,631
Claims priority, application Japan, Apr. 4, 1986, 61-78559
Int. Cl.[4] H04N *5/783*
U.S. Cl. 358—335 **10 Claims**



1. A video signal recording and playback apparatus including means for operation in a varied speed playback mode and adapted for segment recording whereby one field of a video

signal is recorded as N segments on a plurality of video tracks of a recording medium, where N is an integer equal to or greater than 2, the apparatus comprising:

means for inserting segment index signals into predetermined ones of horizontal blanking intervals of each of said segments, with respective ones of N different types of said segment index signals being inserted into corresponding ones of said segments;

means for recording said video signal together with said segment index signals as a recording signal on said recording medium tracks, and for subsequent playback of said recording medium, said recording means comprising a rotary head drum having a period of rotation which is 1/N times a frame repetition period of said video signal during said recording;

means for detecting said segment index signals in a playback signal produced during said varied speed mode of playback operation;

memory means for temporarily storing sequentially produced portions of said playback signal, and;

means for controlling said memory means during said varied-speed playback operation in accordance with segment index signals detected by said detection means, to produce a playback video signal from signals read out of said memory means.

4,887,170

MAGNETIC RECORDING/REPRODUCING APPARATUS FOR MAGNETICALLY REPRODUCING SIGNALS FROM ONE TAPE AND RECORDING THE SIGNALS ONTO A SECOND TAPE

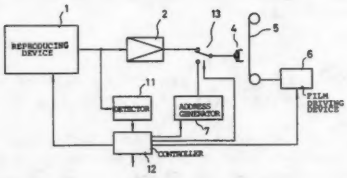
Masami Tsuchida; Shiro Suzuki; Kiichiro Koguchi; Tokihiro Takahashi, and Takayuki Sato, all of Saitama, Japan, assignors to Pioneer Electronic Corporation, Tokyo, Japan

Continuation of Ser. No. 884,343, Jul. 11, 1986, abandoned. This application Feb. 28, 1989, Ser. No. 316,540

Claims priority, application Japan, Jul. 11, 1985, 60-74725

Int. Cl.[4] G11B *5/86, 5/02*

U.S. Cl. 360—15 **11 Claims**



1. A magnetic recording/reproducing apparatus for transferring an information signal from a first tape to a second tape, wherein said information signal comprises a plurality of information portions separated from one another by respective unique address signals said apparatus comprising:

means for reproducing a signal recorded on a first magnetic tape;

means for detecting an address signal from the reproduced signal;

means for generating a new address signal when said detecting means has detected an address signal, said new address signal corresponding to the detected address signal; and

transferring means for applying to an input of said recording means one of said reproduced signal and said address signal generated by said address signal generating means selected in accordance with an output of said address detecting means such that said address signal contained in said reproduced signal is automatically replaced by a new address signal and said new address signal is recorded on said second magnetic tape during the transfer of signals from said first tape to said second tape, thereby making it possible to correctly record said address signals on said second tape automatically.

4,887,171

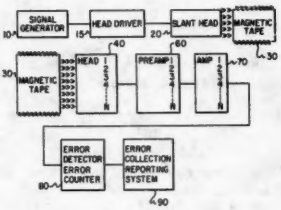
SLANT RECORD/HELICAL SCAN PLAYBACK CERTIFIER

James B. Rose, Sachse, Tex., assignor to E-Systems, Inc., Dallas, Tex.

Filed Apr. 4, 1988, Ser. No. 177,369

Int. Cl.[4] G11B *27/36, 15/14*

U.S. Cl. 360—31 **6 Claims**



1. A slant record/helical scan playback certifier for magnetic tape certification comprising:

a signal generator producing test data;

a slant record head connected to said signal generator for recording the test data on magnetic tape;

a plurality of helical scan playback heads placed downstream of said slant record head for reproducing and transmitting the test data recorded on the magnetic tape; said data recording and playback occurring in a single pass of the record and playback heads;

an error detector and error counter connected to said helical scan playback head for detecting and counting test data errors reproduced from the magnetic tape; and

an error collection reporting system connected to the error detector and error counter for collecting and reporting the test data errors reproduced from the magnetic tape.

4,887,172

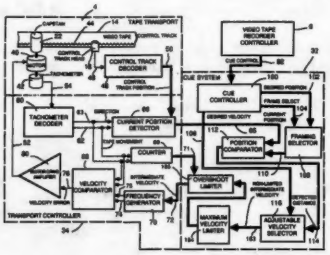
APPARATUS AND METHOD FOR CUEING A VIDEO TAPE RECORDER

Robert B. Steele, Menlo Park, Calif., assignor to Ampex Corporation, Redwood City, Calif.

Filed Apr. 10, 1987, Ser. No. 36,630

Int. Cl.[4] G11B *15/48*

U.S. Cl. 360—73.06 **26 Claims**



1. Apparatus for positioning a location on a tape to a desired position which is continuously changing during a location positioning operation with a selectable desired velocity, wherein the continuously changing desired position is sepa-

rated by a detectable distance from a current position, comprising:

means for generating a detected distance signal indicative of the detected distance between the current position and the desired position which is continuously changing at the rate of the desired velocity from a desired time during the location positioning operation;

means for supplying a current velocity signal indicative of a current velocity of the tape;

means for providing a desired velocity signal indicative of the desired velocity of the tape at the continuously changing desired position;

means responsive to the desired velocity signal and the detected distance signal, for producing an intermediate velocity signal indicative of an intermediate velocity at which the tape presently is moved to achieve the desired velocity at the continuously changing desired position; and

means responsive to the intermediate velocity signal for adjusting the current velocity of the tape to that of the intermediate velocity.

4,887,173

STORAGE APPARATUS INCLUDING HEAD DRIVE CONTROL

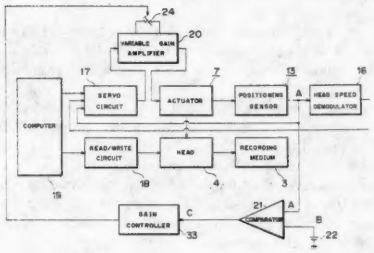
Masaharu Sengoku, and Kimiyo Takahashi, both of Hyogo, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 25, 1988, Ser. No. 262,327

Claims priority, application Japan, Oct. 30, 1987, 62-273102

Int. Cl.[4] G11B *33/00*; G05B *1/06*

U.S. Cl. 360—78.04 **6 Claims**



1. A storage apparatus comprising:

a recording medium rotatably driven for storing data;

head means for writing/reading said data on/from a recording area of said recording medium while being positioned opposite to a predetermined recording area of said recording medium;

actuator means for positioning said head means to said predetermined recording area of the recording medium;

a sensor for sensing a present position of said head means with respect to said recording area of the recording medium to produce a sensor signal;

a servo circuit for controlling a positioning operation of said actuator means based upon said sensor signal;

a reference signal generator for generating a reference signal;

a comparator for comparing said sensor signal with said reference signal to produce a comparator signal;

a gain controller for processing said comparator signal to produce a gain control signal; and,

a variable gain amplifier interposed between said servo circuit and actuator means, for varying an amplification gain of said servo circuit in response to said gain control signal so as to suppress an oscillation phenomenon of a servo system constructed of said servo circuit, actuator means, and sensor.

4,887,174

DEVICE FOR LOADING RECORDING-MEDIUM HOUSING CASE

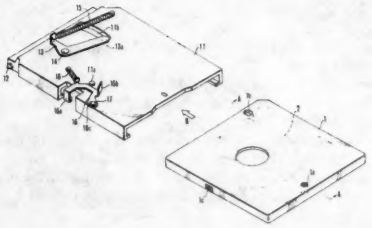
Nobuo Tezuka, Kanagawa, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 911,908, Sep. 25, 1986, abandoned. This application Dec. 16, 1988, Ser. No. 287,580

Claims priority, application Japan, Sep. 30, 1985, 60-216935

Int. Cl.[4] G11B *5/012, 23/03*

U.S. Cl. 360—99.06 **21 Claims**



1. A device for loading a recording-medium housing case in an apparatus, said case having an engaging portion formed therein, said device comprising:

(a) holder means supported by said apparatus for movement between a first position for receipt of said case and a second position at which said case is disposed in a predetermined position in said apparatus for effecting recording or reproducing;

(b) cover means supported by said apparatus for movement between an open position and a closed position, said cover means in said closed position thereof being adapted to cover said holder means with said holder means in said second position thereof;

(c) a locking member having a portion engageable with said case engaging portion for locking said case in said holder means;

(d) means for energizing said locking member in the course of inserting said case in said holder means into locking engagement with said case engaging portion when said case has been inserted into said holder means;

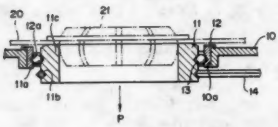
(e) a positioning member for positioning said case at said predetermined position; and

(f) unlocking means arranged on said cover means for unlocking said locking member from such locking engagement with said case engaging portion and moving said locking member to an inactive position thereof where it cannot come into reengagement with said case engaging portion, said unlocking means being arranged to unlock said locking member in accordance with movement of said cover means in only one direction from said open position to said closed position thereof, and said locking member being maintained in said inactive position thereof after said case has been brought to said predetermined position by said holder means and has been positioned therein by said positioning member.

4,887,175
DISC DRIVING UNIT

Akio Hoshi, Chichibu, Japan, assignor to Canon Denshi Kabushiki Kaisha, Saitama, Japan

Continuation of Ser. No. 879,065, Jun. 26, 1986, abandoned. This application Aug. 4, 1988, Ser. No. 229,793
Claims priority, application Japan, Jul. 1, 1985, 60-142507; Aug. 15, 1985, 60-178633
Int. Cl.[4] G11B *17/02*
U.S. Cl. 360—99.08 20 Claims

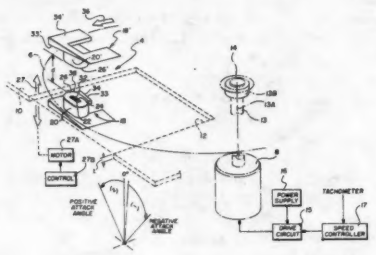


1. A disc driving unit, comprising:
a spindle for engaging and rotating a disc member, said spindle having a first race surface formed by a groove directly formed on a circumferential side surface of said spindle;
a base unit having an opening, said opening receiving said spindle;
a second race surface disposed on a circumferential surface of said base unit surrounding said opening and opposing said first race surface; and
rolling members disposed between and engaging said first and second race surfaces, so that said first and second race surfaces and said rolling members together rotatably support said spindle directly on said base unit.

4,887,176
DOUBLE-SIDED MAGNETIC RECORDING DEVICE SUPPORTING TWO TRANSDUCERS IN FIXED RELATION

Thomas E. Dussinger, Rush; John M. Riley, Rochester, and Gerald J. Kosarko, Pavilion, all of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Aug. 3, 1988, Ser. No. 228,138
Int. Cl.[4] G11B *5/54*
U.S. Cl. 360—105 8 Claims

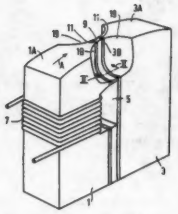


1. Apparatus for accessing both sides of a storage medium, said apparatus comprising:
a drive spindle for supporting the medium for rotation about a drive axis;
first and second transducers;
means for supporting said transducers in fixed relation on opposite sides of the medium so that a fixed separation is established therebetween that is substantially greater than the transducing cross-section of the medium; and
means for establishing relative movement between said drive spindle and said supporting means to bring the apparatus into either of two playing positions, the first playing position disposing the medium in operative relation with the first transducer and fte second playing position disposing the medium in operative relation with the second transducer.

4,887,177
MAGNETIC HEAD HAVING AN ELECTRO-CHEMICALLY INERT GAP OF HARD MATERIAL

Cornelis W. M. P. Sillen, Eindhoven, Netherlands, assignor to U.S.Philips Corp., New York, N.Y.

Filed Dec. 3, 1987, Ser. No. 128,367
Claims priority, application Netherlands, Dec. 3, 1986, 8603078
Int. Cl.[4] G11B *5/235*
U.S. Cl. 360—120 6 Claims

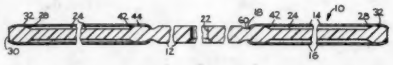


1. A magnetic head for recording, reproducing and/or erasing magnetic information in a track of a magnetic information carrier, comprising
a magnetic core having two core limbs formed from a ferrite, at least one of which has a cladding layer of a magnetic material having a higher saturation magnetization than the ferrite,
a non-magnetic gap present between the core limbs, and
a winding aperture having an electric coil wound around at least one of the core limbs, characterized in that the gap is composed of the following layers:
two first layers of a first metallic material provided on the core limbs, an insulation layer of an electrically insulating material being provided between the cladding layer and one of the first layers, and
two second layers of a second metallic material provided on the first layers, which second layers are bonded to each other.

4,887,178
ALIGNED STRETCHED SURFACE RECORDING MEDIUM

John A. McCracken, White Bear Lake, Minn., and Barry L. Kelley, Wahpeton, N. Dak., assignors to Minnesota Mining and Manufacturing Company, Saint Paul, Minn.

Filed Jun. 13, 1988, Ser. No. 205,686
Int. Cl.[4] G11B *5/62, 5/82;* B32B *31/84;* B23P *11/02*
U.S. Cl. 360—135 20 Claims



1. A two-sided stretched surface recording disk comprising:
(A) an annular support having
(1) at least one base portion between its inside and outside diameters;

(2) an outer raised annular ridge attached to and projecting from the base portion on both sides of the annular support;

(3) an inner raised annular ridge attached to and projecting from the base portion and having a diameter less than that of the outer raised annular ridge on both sides of the annular support;

(B) on one side of the disk, a first annular recording medium film which is

(1) concentric with the annular support;

(2) held in radial tension across and out of contact with the base portion;

(3) bonded to the inner and outer raised annular ridges;

(4) greater than 35 percent anisotropic in a measurement of sonic modulus; and

(C) on the other side of the disk, a second annular recording medium film which is similar in shape and dimensions to the first annular recording medium film, is supported and bonded to the support like the first annular recording medium film;

wherein the first and second annular recording medium films are aligned such that the dihedral angle Θ is not more than ten degrees, said dihedral angle Θ being defined as the angle between

(1) the plane containing the major principal orientation axis of the first film and perpendicular to the plane of the second film, and

(2) the plane containing the major principal orientation axis of the second film and perpendicular to the second film.

4,887,179

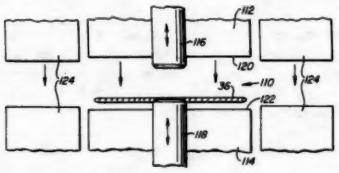
SUBSTRATE FOR RIGID DISK STORAGE MEDIA AND METHOD AND APPARATUS FOR MAKING THE SAME

Thomas U. Coe, Saratoga, Calif., assignor to Furukawa Aluminum Co., Ltd., Tokyo; Kawasaki Steel Corp., Kobe and Itoh & Co., Ltd., Osaka, all of, Japan

Continuation of Ser. No. 165,878, Mar. 9, 1988, abandoned, which is a division of Ser. No. 4,296, Jan. 2, 1987, which is a continuation of Ser. No. 628,177, Jul. 6, 1984, abandoned. This application Apr. 14, 1989, Ser. No. 339,878

Int. Cl.[4] G11B *5/82*

U.S. Cl. 360—135 6 Claims



1. A method for forming a substrate to be used as a rigid disk storage medium comprising:

coining a blank of a malleable, non-magnetic metal to cause flow of the material of the blank on the surface of the blank by employing a pair of dies having flat surfaces faced with the blank, the coining step being performed as the blank is fixed by a shaft and within a stop member to regulate spreading of the material of the blank, whereby a super precise smooth surface is formed.

4,887,180

DEVICE FOR PROTECTING ELECTRONIC EQUIPMENT AGAINST STRONG ELECTROMAGNETIC PULSES, MORE PARTICULARY DUE TO LIGHTENING

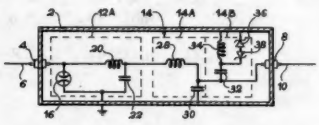
Jean-Pierre Climent, Saint Germain Les Corbeil, and Jean-Claude Tronel, Bretigny Sur Orge, both of France, assignors to Commissariat a l'Energie Atomique, Paris, France

Filed Jun. 15, 1988, Ser. No. 206,723

Claims priority, application France, Jun. 16, 1987, 87 08361; Jun. 16, 1987, 87 08362

Int. Cl.[4] H02H *3/20*

U.S. Cl. 361—91 22 Claims



1. A device for protecting electronic equipment (42) against strong electromagnetic pulses, the equipment being contained in a radioelectrically insulated enclosure (40) and connected to a line outside the enclosure, the protective device being disposed in another radioelectrically insulated enclosure (2) and comprising an input (4) connected to said line (6) and an output (8) connected to the equipment, the device being characterized in that it comprises in series:

at least on first clipping cell (12A) comprising a clipper having one end connected to the input of the clipping cell and another end to ground, and a low-pass filter disposed between the input and the output of the clipping cell, and

a filtering cell (14) comprising a low-pass filter (14*a*).

4,887,181

CIRCUIT FOR TEMPERATURE PROTECTION WITH HYSTERESIS

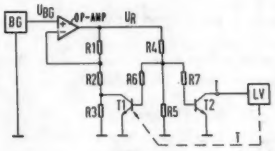
Michael Lenz, München, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Continuation-in-part of Ser. No. 763,830, Aug. 8, 1985, abandoned. This application Aug. 25, 1987, Ser. No. 89,145

Claims priority, application Fed. Rep. of Germany, Aug. 10, 1984, 3429555

Int. Cl.[4] H02H *5/04*

U.S. Cl. 361—103 17 Claims



1. Temperature protection circuit, comprising a band gap circuit furnishing a first reference voltage being temperature independent, an amplifier circuit, having temperature-determining circuit parts, connected to said band gap circuit for receiving and amplifying said first reference voltage and supplying a second reference voltage, a negative feedback network connected to said amplifier circuit for feeding back said second reference voltage to said amplifier circuit, a sensor circuit connected to said amplifier circuit temperature-determining circuit parts thermally coupled to said sensor circuit and generating a temperature dependent voltage within said sensor circuit, said sensor circuit comparing said second reference voltage with said temperature dependent voltage accord-

ing to a given comparison criterion, input means being activated by said sensor circuit if said comparison criterion is fulfilled for controlling the temperature-determining circuit parts, and a feedback of said sensor circuit to said negative feedback network.

4,887,182

CIRCUIT PROTECTION DEVICE

Martin Sweet, Swindon, England, assignor to Raychem Limited, England

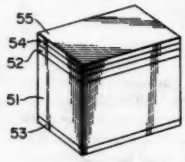
Continuation of Ser. No. 218,511, Jul. 5, 1988, abandoned, which is a continuation of Ser. No. 99,949, Sep. 23, 1987, abandoned.

This application May 2, 1989, Ser. No. 348,142

Claims priority, application United Kingdom, Sep. 26, 1986, 8623178

Int. Cl.[4] H02H *1/00*

U.S. Cl. 361—117 **17 Claims**



1. A circuit protection device for protecting an electrical circuit from a voltage transient which comprises:

a threshold switching element that will change from a high resistance state to a low resistance state on application of a voltage, but will remain in its low resistance state only for as long as a small holding current is maintained through the element, the switching element being formed from an amorphous composition comprising:

(a) 10 to 34 atomic percent germanium;

(b) up to 45 atomic percent antimony; and

(c) from 45 to 90 atomic percent selenium,

in which the proportions of (a), (b) and (c) (based on the total molar quantity of (a), (b) and (c)) add up to 100% and in which the proportion of (c) is greater than the proportion of (a) by at least 10 atomic percent;

and a pair of electrodes in contact with the composition.

4,887,183

COMMUNICATION SYSTEM THERMOPROTECTION DEVICE FOR OVER VOLTAGE SUPPRESSOR MOUNTED IN OVERVOLTAGE SUPPRESSOR MAGAZINES OF COMMUNICATION SYSTEMS

Lutz Biederstedt, and Manfred Muller, both of Berlin, Fed. Rep. of Germany, assignors to Krone AG, Berlin, Fed. Rep. of Germany

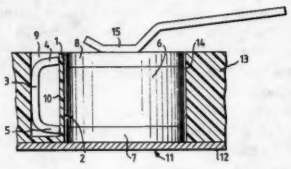
Filed Oct. 13, 1988, Ser. No. 257,388

Claims priority, application Fed. Rep. of Germany, Oct. 20, 1987, 3735837; Jun. 10, 1988, 38202727

Int. Cl.[4] H02H *9/04*

U.S. Cl. 361—124 **7 Claims**

1. An overvoltage suppressor, comprising a metal ground plate, an overvoltage suppressor housing defining a suppressor chamber with a suppressor, contacts located at the top of and the bottom of said suppressor, one of said contacts being in engagement with said ground plate and another of said contacts being positioned spaced from said one of said contacts, means defining a spring chamber, thermoplastic wall means separating said spring chamber from said suppressor chamber, a U-shaped positioned spring in said spring chamber having a first leg aligned with said one contact and having an opposite second leg aligned with said another contact and having an intermediate bow-type spring portion, and thermoplastic wall means being formed of a material which will melt so that said bow-type spring portion will urge said spring legs to penetrate through said thermoplastic wall means and cause



contact between said legs and corresponding said contacts providing electrical connection between said contacts.

4,887,184

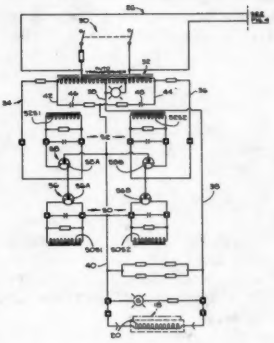
DEMAGNETIZER

Joseph A. Armond, River Forest, Ill., assignor to Electro-Matic Products Co., Chicago, Ill.

Filed Jan. 17, 1984, Ser. No. 571,387

Int. Cl.[4] H01H *17/00*

U.S. Cl. 361—149 **5 Claims**



1. Apparatus demagnetizing a chuck having an electromagnet in operative association therewith, and circuit means connecting a chuck in circuit with an electric source of predetermined voltage value, comprising,

said circuit means including a power circuit and a control circuit,

the power circuit directly including a chuck,

the circuit means including two sets of transformers including a ON set and a DEMAG set, each set including a primary and a pair of secondaries, the control circuit including the primaries and the power circuit including the secondaries and first gate means controlled by the secondaries,

the first gate means being interposed between the electric source and the chuck and controlling the chuck,

the power circuit conducts current from an AC source to the chuck,

the secondaries of each set and corresponding first gates produce unidirectional current in respectively reverse directions,

the control circuit including a triggering circuit, energizing said sets of transformers,

second gate means for controlling the triggering circuit, the triggering circuit effecting current in successively opposing directions through a chuck and at successively reduced voltage for degmagnetizing the chuck,

manually settable means controlling the triggering circuit and operable through a range between low and high points and operable in response to being set in a predetermined point in said range, for effecting application of voltage from said electric source to the chuck of a value that is a portion of said predetermined value of the voltage of the source in proportion to the setting of said manually settable means in its range,

the triggering circuit including a driver unit which includes a plurality of resistances, and

control means for controlling the driver unit including a manually settable potentiometer and a capacitor, and the potentiometer and capacitor being operable for determining the number of resistances put in circuit and thereby determining the value of the voltage applied to the transformers.

4,887,185

THROUGH TYPE CAPACITOR

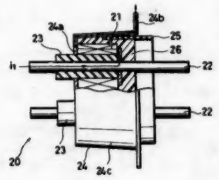
Mitsunao Okumura, Kyoto, Japan, assignor to Murata Manufacturing Co., Ltd., Nagaokakyo, Japan

Filed Dec. 19, 1988, Ser. No. 286,209

Claims priority, application Japan, Dec. 17, 1987, 62-193026[U]; Dec. 22, 1987, 62-195099[U]; Apr. 7, 1988, 62-87651

Int. Cl.[4] H01G 4/42

U.S. Cl. 361—302 **16 Claims**



1. A through type capacitor formed of a capacitor unit having a through terminal inserted there through and a grounding member surrounding the capacitor unit, comprising:

a through terminal having conductivity and the shape of a rod,

a capacitor unit having a first electrode on a first end, a second electrode on a second end of the axial length thereof, and a through hole extending throughout said capacitor unit, through which said through terminal is inserted,

a grounding member formed in a cup-like shape with an outer portion having an opening at one end and a bottom portion at the other end,

a connecting member electrically connecting said through terminal inserted through said capacitor unit and the first electrode of said capacitor unit near said opening, and

said grounding member having a connecting portion connected with the second electrode of said capacitor unit at said bottom portion, such that current flow through the outer portion of the grounding member is in the opposite direction to current flow through said capacitor unit.

4,887,186

MULTI-LAYERED DIELECTRIC ELEMENT

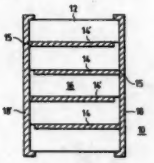
Takeshi Takeda, Kawasaki; Sohji Tsuchiya, Kanagawa; Yoshio Watanabe, Yokohama, and Satoshi Sekido, Kawasaki, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Apr. 12, 1989, Ser. No. 337,594

Claims priority, application Japan, Apr. 12, 1988, 63-89833; Sep. 5, 1988, 63-221714

Int. Cl.[4] H01G 4/10; H01B 3/12, 1/06

U.S. Cl. 361—321 **19 Claims**



1. A multi-layered dielectric element which comprises a multi-layered unit including a plurality of dielectric layers formed of a perovskite oxide capable of sintering at a temperature of from 900° to 1100° C. and a plurality of internal electrode layers which are, respectively, sandwiched between adjacent dielectric layers so that the respective internal electrode layers have exposed portions which allow contact with external electrodes, said internal electrodes layers being each made of at least one conductive composite oxide of La, Ba and Cu having a perovskite-like structure wherein the atomic ratios of the metals are such that (La+Ba)/Cu=1 and La/Ba=4, or at least one conductive composite oxide of La, Sr and Cu having a perovskite-like structure wherein the atomic ratios of the metals are such that (La+Sr)/Cu=1 and La/Sr=3 or 4, said unit being sintered at a temperature of from 900° to 1100° C.

4,887,187

PLURAL UTILITY SUPPLY PEDESTAL INCLUDING CONTAINED COMMON GROUNDING MEANS

Anne D. Nickola, G-6261 N. Saginaw Rd., Mt. Morris, Mich. 48458

Continuation-in-part of Ser. No. 869,687, Jun. 2, 1986, Pat. No. 4,751,610. This application Jun. 14, 1988, Ser. No. 206,603

Int. Cl.[4] H02B 9/00

U.S. Cl. 361—369 **13 Claims**

1. An apparatus for simultaneously supporting a plurality of groundable utility supply means and providing a prewired common ground to said plurality of supply means, comprising:

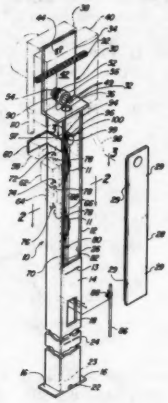
a plurality of groundable utility supply means, said plurality of supply means including an electrical panel having an affixed neutral bar;

an elongated, hollow, nonconductive plastic post;

means mounting said plurality of utility supply means to said post;

common ground means contained in said post, comprising a single continuous ground wire connectable to said electrical panel neutral bar and extending interiorly of said post,

and a grounding bar disposed within said post and connected to said ground wire; and



means adapted to ground each of said utility supply means to said grounding bar.

4,887,188

CONNECTOR FOR A MEMORY CARD

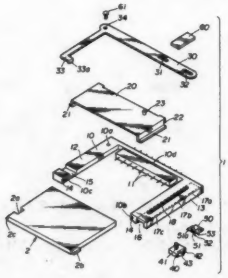
Junichi Yoshida; Shinichi Sugano, and Masaaki Koike, all of Tokyo, Japan, assignors to Casio Computer Co., Ltd., Tokyo, Japan

Filed Sep. 6, 1988, Ser. No. 240,918

Claims priority, application Japan, Dec. 22, 1987, 326493; Dec. 23, 1987, 323836

Int. Cl.[4] H01R *23/68*

U.S. Cl. 361—413 **11 Claims**



1. A connector for a memory card, comprising:

a connector body for receiving a memory card, said connector body having a one piece structure which includes a central portion and a pair of guide arms, said guide arms being disposed at spaced apart positions along the width direction of said memory card so as to form a receiving space for receiving said memory card;

a plurality of connecting terminals mounted on said central portion of said connector body;

card ejecting means mounted on said connector body and including an actuator for ejecting said memory card away from said receiving space;

power supply means mounted on said connector body, and including:

at least two terminal electrodes which are arranged to make and break contact with each other; and

switching means for causing said at least two terminal electrodes to selectively make contact or break contact; and

actuating means, including an actuating member mounted on said connector body, for moving said actuator between a memory card receiving position and a memory card ejecting position and for moving said switching means between an on-position to cause said at least two terminal electrodes to contact and an off-position to cause said at least two terminal electrodes to break contact, responsive to an operation of said actuating member.

4,887,189

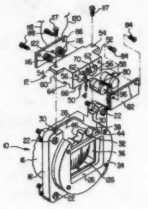
AIRCRAFT INSTRUMENT ILLUMINATING APPARATUS

James R. Garrett, Highland Village, Tex., assignor to Executive Technical Services, Inc., Addison, Tex.

Filed Mar. 17, 1988, Ser. No. 169,414

Int. Cl.[4] G01D *11/28*

U.S. Cl. 362—23 **22 Claims**



1. Apparatus for illuminating an aircraft cockpit instrument or the like, comprising:

a sealed housing having an internal cavity bounded by a first exterior wall portion formed from a highly thermally conductive heat sink material, and a translucent second exterior wall portion;

bulb means, disposed within said internal cavity, for receiving electrical energy and responsively generating light within said internal cavity and outwardly through said translucent second exterior wall portion of said housing;

power transmitting means for transmitting electrical energy from a source thereof to said bulb means to energize the same; and

heat conducting means for defining a conductive heat flow path from said bulb means to said heat sink material, whereby heat generated by said bulb means is conducted to said heat sink material for external dissipation therefrom,

said heat conducting means including a resilient, electrically resistive yet relatively highly heat conductive material engaging and secured to said bulb means, interposed between said bulb means and said first exterior wall portion of said housing, and resiliently supporting said bulb means within said internal cavity.

4,887,190

HIGH INTENSITY FIBER OPTIC LIGHTING SYSTEM

Dean J. Sadamune, and Shawn J. Fagen, both of Santa Monica, Calif., assignors to In Focis Devices Inc., Beverly Hills, Calif.

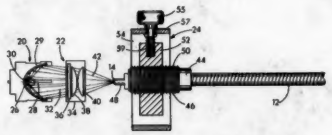
Filed Oct. 15, 1988, Ser. No. 253,496

Int. Cl.[4] F21V *7/04*

U.S. Cl. 362—32 **14 Claims**

1. A high intensity fiber optic lighting system comprising an

incoherent light source having a pair of electrodes including at least one forward electrode, a non-spheric curved reflector of three-dimensional configuration having as a line of symmetry an axis of elongation defining an optic axis for the reflector containing a focal point, at least the forward electrode being aligned along said optic axis and the light source being located substantially at the focal point of the reflector whereby the reflector intercepts light rays from the light source and reflects the intercepted rays forwardly at least in general alignment with the optic axis of the reflector, a condensing lens assembly



positioned to receive the generally aligned reflected rays and to focus them to a focal point, at least one optical fiber having an inlet end with a longitudinal axis aligned or parallel to the optic axis of the reflector and positioned substantially at the focal point of the rays passing through the condenser, said fiber also having an outlet end providing an artificial point source of light located at said outlet end of the fiber, a columnating lens positioned to receive light from the artificial point source and spaced therefrom by a distance equal to its focal length to thereby produce a high intensity columnated light beam for illuminating purposes.

4,887,191

ARRANGEMENT FOR THE SUSPENSION OF A LIGHTING UNIT ON VEHICLES

Rolf Johansson, Trosa, Sweden, assignor to Saab-Scania Aktiebolag, Sweden

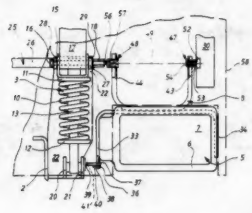
PCT No. PCT/SE88/00005, § 371 Date Oct. 7, 1988, § 102(e) Date Oct. 7, 1988, PCT Pub. No. WO88/06109, PCT Pub. Date Aug. 25, 1988

PCT Filed Jan. 15, 1988, Ser. No. 259,268

Claims priority, application Sweden, Feb. 10, 1987, 8700497.4

Int. Cl.[4] B60Q *1/00*; F21V *15/04*

U.S. Cl. 362—61 **14 Claims**



1. Arrangement for the suspension of a front lighting unit on a vehicle, wherein the vehicle has a chassis frame and has a body work element that is suspended on the chassis frame and is relatively movable with respect to the chassis frame,

the arrangement comprising

a spring device between the chassis frame and the body work element for damping the vibration of the body work element with respect to the chassis frame;

the lighting unit including a lamp for directing light out the front of the vehicle chassis frame;

at least one upper connecting arm which is pivotably connected to the chassis frame for permitting relative movement of the upper arm with respect to the chassis frame; the upper connecting arm also being pivotably connected to the lighting unit; at least one lower connecting arm extending below the upper connecting arm also being pivotably connected to the lighting unit; at least one lower connecting arm extending below the upper connecting arm, and the lower connecting arm is also pivotably connected to the chassis frame for permitting relative movement of the lower arm with respect to the chassis frame; the lower connecting arm also being pivotably connected to the lighting unit; the upper and the lower connecting arms being essentially parallel in a longitudinal vertical plane relative to the vehicle;

the lighting unit being further pivotably connected to the body work element such that as the body work element moves with respect to the chassis frame, which movement is damped by the spring device, the lighting unit is held at an orientation such that the optical axis of the lighting unit executes a parallel movement in the vertical plane.

4,887,192

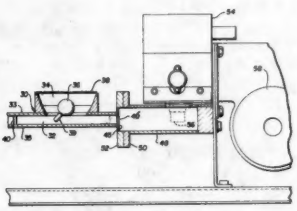
ELECTRODELESS LAMP HAVING COMPOUND RESONANT STRUCTURE

James E. Simpson, Gaithersburg; Mohammed Kamarehi, Rockville, and Michael G. Ury, Bethesda, all of Md., assignors to Fusion Systems Corporation, Rockville, Md.

Filed Nov. 4, 1988, Ser. No. 267,426

Int. Cl.[4] F21K *7/00*

U.S. Cl. 362—265 **24 Claims**



1. An electrodeless lamp comprising,

a microwave cavity,

a bulb containing a plasma forming medium in said cavity,

means for generating microwave energy, and

means for coupling the generated microwave energy to said cavity,

wherein said cavity comprises a compound resonant structure having first and second discrete portions of different cross-sectional areas, there being a discontinuity in said cavity between said first and second portions where said cross-sectional area changes, said microwave energy being coupled to said first cavity portion, and said bulb being located substantially within said second cavity portion, said second cavity portion comprising a reflector for reflecting radiation emitted by said bulb out of said cavity.

4,887,193

MOUNTING APPARATUS FOR A LAMP OR SIMILAR DEVICE

Ralf E. Dieckmann, P.O. Box 65, Wilmot, N.H. 03287

Filed Dec. 15, 1987, Ser. No. 133,079

Int. Cl.[4] F21V *33/00*

U.S. Cl. 362—89 **9 Claims**

1. An accessory mounting apparatus for a machine including;

a substantially continuous mount ring having an outermost periphery,

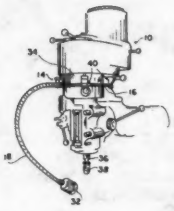
means attaching said mount ring to the machine in a fixed substantially horizontal plane,

said mount ring attaching means including a plurality of circumferentially disposed and arcuately spaced apart

attachment assemblies each including a bracket fixed relative to the machine,

a guide rotatably connected to each said bracket, said guides provided with a radially and outwardly facing channel therewithin,

said mount ring disposed within said radially and outwardly facing channels and restrained from vertical displacement therewithin but, with sufficient clearance to enable sliding rotation of said mount ring in said horizontal plane within said channels and concentrically about said machine,



said mount ring having an outermost periphery clear of said guides,

an extension arm having an accessory head at one end and an arm mount member at the other end, and

said extension arm mount member rigidly connected to said mount ring outermost periphery, whereby said extension arm is arcuately movable with said extension arm about the machine.

4,887,194

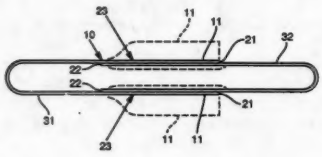
HEADBAND FOR HOLDING FLASHLIGHTS DIRECTED AT A VIEWING AREA

Tom R. Fields, 5714 Verner Oak Ct., Sacramento, Calif. 95841

Continuation-in-part of Ser. No. 159,676, Feb. 24, 1988, Pat. No. 4,797,793. This application Jan. 9, 1989, Ser. No. 294,889

Int. Cl.[4] F21L *15/14*

U.S. Cl. 362—105 **9 Claims**



1. A headband wearable on the head of a user, for retaining flashlights adjacent to the user's temple and oriented to project a light beam in a forward direction generally in the direction the user is facing, comprising:

two bands of elastic, stretchable material formed generally into a loop sized to fit about a user's head when stretched,

the band being formed from separate front and rear straps of material each having two ends, with the ends of the front and rear strap being overlapped by an overlap distance of sufficient length generally to accommodate the length of a cylindrical portion of a flashlight,

the overlapped portions of the band being secured along edges of the two layers of strap so as to form a pocket between the two layers at left and right of the headband, each open at a forward end, with an outer strap layer being exposed outwardly at the forward end of each overlapped portion, and

the width of the strap of material being sufficient to accommodate in the pocket a cylindrical portion of a flashlight.

4,887,195

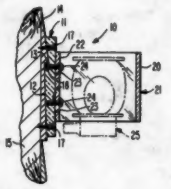
ILLUMINATED HOUSE NUMBER ENCLOSURE

John M. Donelan, 12 Cambridge Rd., Norwood, Mass. 02062

Filed Aug. 1, 1988, Ser. No. 226,453

Int. Cl.[4] F21S *1/02*

U.S. Cl. 362—147 **1 Claim**



1. An illuminated house number enclosure, for a house number located on a front wall of said enclosure, comprising, in combination, a transparent main body and a pair of bases for mounting said main body to a shingled siding of a house; said main body being vertically channel-shaped by comprising said front wall and a pair of opposite side walls integral therewith around a central space for receiving a lamp therein, and a sidewardly outward wing formed along a rear edge of each said side wall; each said base including a rear side having an angularly inclined, upper and lower face which are paralled to each other, said faces being stepped relative to each other so to form a single, horizontal step riser therebetween for abutment against an under side edge of a plank of said house shingled siding; a pair of keyhole-shaped openings in each said wing receiving headed screws therethrough for selectively dismounting said main body from said bases; and a pair of threaded openings in each said base receiving said headed screws, and a countersunk pair of openings in each said base receiving flat headed screws for fixedly mounting said bases to said house siding.

4,887,196

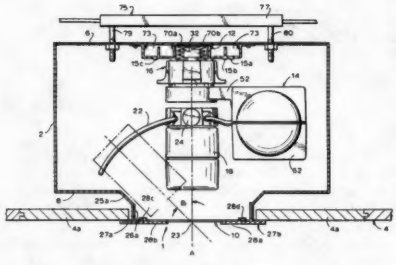
RECESSED TRACK LIGHTING SYSTEM

Tobias A. Brown, Oak Park; Scott L. Roos, Glenview; Donald D. Biancalana, Schaumburg, and Donald J. Westgaard, Carol Stream, all of Ill., assignors to Alkco Manufacturing Company, Franklin Park, Ill.

Filed Oct. 14, 1988, Ser. No. 257,761

Int. Cl.[4] F21S *1/02*

U.S. Cl. 362—148 **18 Claims**



1. A recessed track lighting system comprising:

a housing adapted to be recessed in a ceiling and including a top wall, means defining an elongated opening spaced downwardly from said top wall, and means defining a channel along said top wall extending parallel to said elongated opening and laterally centered in respect thereto; and

at least one light fixture adapted to be mounted within said

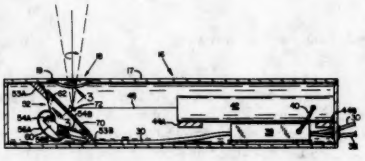
housing and including adapter means releasably engageable in said channel and being movable along the latter, said adapter means defining an axis of rotation that substantially bisects the width of said elongated opening, a lamp head, lamp head support means rotatable around said axis of rotation and including arcuate guide means extending generally radially from said axis of rotation and having a curvature centered substantially at the lateral center of said opening, means for mounting the lamp head on said arcuate guide means for adjustable movement therealong, said lamp head having a light source directing light along a light beam axis which, in all positions of the lamp head along the arcuate guide means, intersects the axis of rotation at the plane of the opening.

4,887,197

METHODS AND APPARATUS FOR GENERATING LIGHT PATTERNS RESPONSIVE TO AUDIO FREQUENCY INPUT SIGNALS

Mark A. Effinger, Vancouver, Wash., assignor to O'Ryan Industries, Vancouver, Wash.

Filed Apr. 29, 1988, Ser. No. 188,207
Int. Cl.[4] F21V 7/00
U.S. Cl. 362—306 **11 Claims**



1. A display system for generating a visible pattern on a display surface responsive to an audio frequency input signal, comprising:

means for emitting a visible beam of light along a predetermined beam axis;

reflecting means interposed along the beam axis for reflecting the light beam to form a reflected beam directed generally toward the display surface;

oscillating means, including a speaker, responsive to the audio frequency input signal for oscillating the reflecting means to generate a pattern on the display surface;

the oscillating means further including a flexible diaphragm acoustically coupled to the speaker so that the diaphragm distends in response to actuation of the speaker by the input signal and including means for mounting the reflecting means on the diaphragm so as to move the reflecting means angularly in response to distension of the diaphragm;

the mounting means further including pedestal means connected to the front side of the diaphragm for supporting the reflecting means spaced apart from the diaphragm to amplify said motion of the reflecting means in response to distension of the diaphragm; and

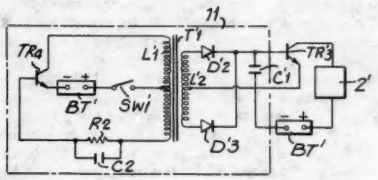
the pedestal means including a generally cylindrical pedestal formed of a pliable silicone material having a top end and a bottom end, connected at the bottom end to the diaphragm and connected at the top end to the back of the reflecting means, for maintaining the reflecting means spaced apart from the diaphragm and in substantially parallel relation to the diaphragm.

4,887,198

ELECTRONIC LARGE CURRENT SWITCH FOR A SINGLE POWER CIRCUIT

Youn S. Lee, Seoul, Rep. of Korea, assignor to Jang B. Lee

Filed Mar. 1, 1988, Ser. No. 162,751
Int. Cl.[4] H02M 3/338
U.S. Cl. 363—18 **5 Claims**



1. An electronic large current switch for a single power circuit especially adapted for vehicle use comprising:

a DC-to-DC converter for low voltage to lower voltage transformation which is controlled by a control switch or a periodic switching circuit; and

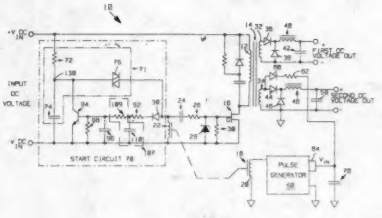
a switching transistor supplied with the low voltage output of said DC-to-DC converter as the base bias voltage thereof and which controls the power supply to an electrical load circuit, said output of said DC-to-DC converter providing increased base current to said switching transistor in order to substantially lower the saturation voltage of said switching transistor and thereby minimize power loss of the switching transistor.

4,887,199

START CIRCUIT FOR GENERATION OF PULSE WIDTH MODULATED SWITCHING PULSES FOR SWITCH MODE POWER SUPPLIES

Rex W. J. Whittle, Kowloon, Hong Kong, assignor to Astec International Limited, Hong Kong

Continuation-in-part of Ser. No. 827,808, Feb. 7, 1986, Pat. No. 4,695,936. This application Sep. 22, 1987, Ser. No. 99,532
The portion of the term of this patent subsequent to Sep. 22, 2004, has been disclaimed.
Int. Cl.[4] H02M 3/335
U.S. Cl. 363—49 **10 Claims**



1. In a DC/DC converter power supply including a DC voltage source, a power transformer including a primary winding and a secondary winding, rectifier and filter means connected to said secondary winding for generating an output DC voltage from the current output by said secondary winding, pulse generator means for generating a train of pulses of varying pulse width as a function of the present value of said output voltage, power switch means coupled to said primary winding such that when said power switch means closes, said DC voltage source is coupled across said primary winding, means for coupling said train of pulses to said power switch means, said pulses causing said power switch means to close for the

duration of each said pulse, and means for coupling ongoing power to said pulse generator means once said pulse generator means begins operation, the improvement comprising start means responsive to the initiation of said DC voltage source for starting the operation of said pulse generator means, said start means comprising: relaxation oscillator means connected to said DC voltage source for periodically generating a start pulse at a predetermined frequency, means for coupling said start pulse to said power switch means, said start pulse causing said power switch means to close for a predetermined duration, means connected to said secondary winding for powering said pulse generator means from the energy coupled to said secondary winding by said switch means closures, disabling means for selectively disabling said relaxation oscillator means when said pulse generator means begins to be powered by said ongoing power; and delay means coupled to said disabling means for delaying electrical removal of said disabling means from said start means for a preselected period after shutdown of said power supply.

4,887,200

METHOD AND APPARATUS FOR DETERMINING THE ACTUAL VALUE OF THE MARGIN-ANGLE IN THE VALVES OF AN INVERTER

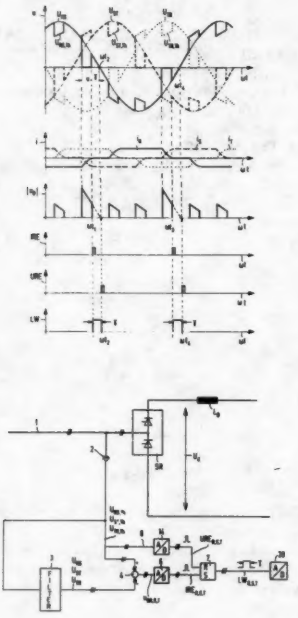
Helmut Neupauer, deceased, late of Erlangen, Fed. Rep. of Germany (by Elfriede Neupauer, heir), assignor to Siemens Aktiengesellschaft, Munich, Fed. Rep. of Germany

Filed Sep. 23, 1988, Ser. No. 248,554

Claims priority, application Fed. Rep. of Germany, Sep. 24, 1987, 3732228

Int. Cl.[4] H02M *1/084*

U.S. Cl. 363—81 **11 Claims**



1. A method for determining the margin angle at the valves of an inverter, the method comprising the steps of:

forming an end-of-conduction pulse indicating extinction of a current through a corresponding valve due to a preceding current commutation, said end-of-conduction pulse being formed with an end of a deviation of a valve voltage from a waveform of a corresponding fundamental, said deviation occurring for the duration of said commutation;

determining a phase angle of said end-of-conduction pulse, and a phase angle of a zero crossing of said valve voltage; and

forming a difference between said pulse angle of said zero crossing of said valve voltage and said phase angle of said end-of-conduction pulse.

4,887,201

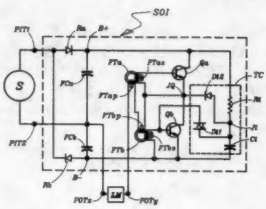
SELF-OSCILLATING INVERTER WITH ADJUSTABLE FREQUENCY

Ole K. Nilssen, Caesar Dr., Barrington, Ill. 60010

Continuation of Ser. No. 853,850, Apr. 21, 1986, abandoned. This application Oct. 11, 1988, Ser. No. 256,202

Int. Cl.[4] H02M *7/5387*

U.S. Cl. 363—132 **9 Claims**



1. An arrangement comprising:

a source of DC power;

inverter connected in circuit with the source of DC power and operative to oscillate in response to a control input received at a set of inverter control terminals, thereby through inverter oscillation to convert the DC power into an AC output provided at a set of inverter output terminals;

load means connected with the inverter output terminals and operative to utilize a first part of the AC output provided thereat;

positive feedback means: (i) connected in circuit between the inverter output terminals and the inverter control terminals, and (ii) operative by way of saturable inductor means to utilize a second part of the AC output to provide said control input, thereby to cause the inverter to oscillate, the second part being small compared with the first part; the saturable inductor means being: (i) receptive of an adjustable magnetic flux, and (ii) operative in response to the adjustable magnetic flux to correspondingly adjust the frequency of inverter oscillation; and

magnetic flux means adapted to provide adjustable magnetic flux to the saturable inductor means;

whereby the frequency of oscillation can be adjusted by way of subjecting the saturable inductor means to only a relatively small part of the AC output from the inverter means.

4,887,202

INPUT-OUTPUT CONTROL METHOD IN A VIRTUAL MACHINE SYSTEM

Shunji Tanaka, Machida, and Hidenori Umeno, Kanagawa, both of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Jul. 30, 1986, Ser. No. 890,524

Claims priority, application Japan, Jul. 31, 1985, 60-170430

Int. Cl.[4] G06F *9/10, 4/00*

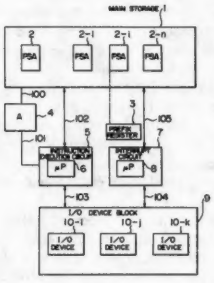
U.S. Cl. 364—200 **10 Claims**

1. In a virtual machine system for running a plurality of operating systems on one machine under control of a virtual

machine control program (VMCP), said system including a plurality of input/output devices and a circuit for processing instructions for starting said input/output devices and for processing input/output interrupts, wherein (i) when a first instruction requiring a start of a first input/output device among said plurality of input/output devices dedicated to one running operating system and having an interruption level dedicated to said one running operating system is issued during a time when said first input/output device is in a direct input-/output execution mode, said circuit starts said first input/output device to execute an input/output operation indicated by the first instruction without interrupting said VMCP, (ii) when an input/output interrupt is provided thereafter from said first input/output device, said circuit processes said input/output interrupt without interrupting said VMCP, (iii) when said first instruction is issued from said one running operation system during a time when said first input/output device is in a simulation mode or when a second instruction requiring a start of a second input/output device other than said first input/output device is issued from another running operation system, said circuit provides said VMCP with an instruction interrupt to request execution of simulation of said first or second instruction, (iv) when an input/output interrupt is issued thereafter from said first or second input/output device, said circuit is provided an input/output interrupt to said VMCP to request execution of simulation of said input/output interrupt, and (v) said VMCP executes the simulation of said first or second instruction or the simulation of an input/output interrupt in response to said instruction interrupt or said input/output interrupt provided by said circuit; a method of input/output control for changing mode of operation of said first input/output device from a simulation mode to a direct input/output execution mode, comprising the steps of:

(a) detecting a status of execution of simulation be said VMCP regarding said first input/output device and a status of execution of an input/output start instruction regarding said first input/output device as issued from said VMCP; and

(b) determining whether said status of execution of said simulation and said status of execution of said input/out start instruction satisfy a predetermined mode change condition so as to indicate said direct input/output execution mode to said circuit as a mode of operation of said first input/output device when a result of the determination is affirmative.



4,887,203

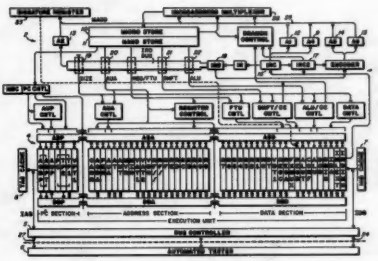
MICROCODED PROCESSOR EXECUTING MICROROUTINES WITH A USER SPECIFIED STARTING MICROADDRESS

Douglas B. MacGregor; William C. Moyer, both of Austin, Tex.; John E. Zolnowsky, Menlo Park, Calif., and David S. Mothersole, Austin, Tex., assignors to Motorola, Inc., Schaumburg, Ill.

Continuation of Ser. No. 660,587, Oct. 15, 1984, abandoned. This application Feb. 26, 1988, Ser. No. 165,409

Int. Cl.[4] G06F 9/22, 9/26, 9/40

U.S. Cl. 364—200 3 Claims



1. In a microcoded data processor using microcode comprising:

a microstore which stores a first plurality of microroutines, each microroutine having a different predetermined starting microaddress;

an instruction decoder which receives each of a plurality of instructions for execution by said processor and specifies the starting microaddress for a respective one of said first plurality of microroutines of each of said plurality of instructions; and

a micromachine which executes the one of said first plurality of microroutines having the specified starting microaddress, to control the operation of the processor in the execution of the respective one of said instructions,

wherein, in the execution of a predetermined instruction provided by a user, the processor also receives one of a plurality of user specified microaddresses directly from the user each of which cannot be generated by the micromachine, said one user specified microaddress accessing microcode of the data processor, and the micromachine thereafter controlling the operation of the processor in accordance with one of a second plurality of additional special function microroutines starting at said user specified microaddress, a method for direct entry by the user into the microcode comprising the steps of:

providing the second plurality of additional special function microroutines in the microstore, each microroutine of the second plurality having a user specified starting microaddress which is different from the starting microaddresses of said first plurality of microroutines;

selectively coupling said predetermined instruction provided by the user to said processor for execution thereby;

during the execution by said processor of said predetermined instruction provided by the user, providing to said processor as said user selected microaddress the starting microaddress of said selected microroutine of the second plurality of microroutines; and executing said user selected microroutine with the micromachine only if, in response to the execution by the processor of said instruction provided by the user, the processor receives the starting microaddress of said selected microroutine as said user selected microaddress.

4,887,204

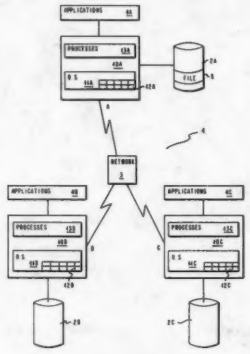
SYSTEM AND METHOD FOR ACCESSING REMOTE FILES IN A DISTRIBUTED NETWORKING ENVIRONMENT

Donavon W. Johnson, Georgetown; Grover H. Neuman; Charles H. Sauer, both of Austin; Amal A. Shaheen-Gouda, and Todd A. Smith, both of Austin, all of Tex., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Feb. 13, 1987, Ser. No. 14,897

Int. Cl.[4] G06F *15/16*

U.S. Cl. 364—200 **21 Claims**



1. A system for accessing a file residing in a server processing system at a server node by at least one client processing system at least one client node, said system comprising:

at least one client cache in the at least one client processing system caching blocks of the file at the at least one client node;

means for generating a file synchronization mode for the file, said file synchronization mode being dependent upon how many and which processes in the network have the file open, and whether the file is open for read only or write access; and

means for managing said at least one client cache through the file synchronization mode.

4,887,205

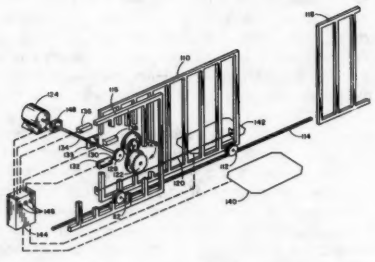
GATE CONTROL SYSTEM

Tom M. Chou, 800 Avendia Salvador, San Clemente, Calif. 92672

Filed Jul. 1, 1987, Ser. No. 65,191

Int. Cl.[4] E05F *15/10, 15/20;* **H02P** *1/22, 1/04*

U.S. Cl. 364—400 **9 Claims**



1. A system for controlling a gate, comprising:

(a) motor means for driving said gate;

(b) locking means for locking said gate against movement;

(c) microprocessor means connected to said motor means and said locking means for unlocking said gate and for causing said motor means to open and close said gate in response to command signals applied to said microprocessor means; and

(d) obstruction sensing means connected to said microprocessor means for detecting the occurrence of an obstruction during the motion of said gate;

(e) said microprocessor means being arranged to normally lock said gate substantially whenever said motor means are stopped, but to maintain said gate unlocked for a predetermined time upon occurrence of said obstruction.

2. A system controlling a gate, comprising:

(a) motor means for driving said gate;

(b) radio means for producing radio signals for actuating said gate;

(c) microprocessor means connected to said motor means for causing said motor means to open and close said gate in response to command signals applied to said microprocessor means, said command signals including said radio signals; and

(d) obstruction sensing means connected to said microprocessor means for detecting the occurrence of an obstruction during the motion of said gate;

(e) said microprocessor means being arranged to normally automatically reclose said gate a first predetermined time after opening said gate in response to one of said radio signals, but to disable said automatic reclosing in response to said radio signals and to instead cause said radio signals to produce alternate opening and closing of said gate upon occurrence of said obstruction.

3. A system for controlling a gate, comprising:

(a) motor means for driving said gate;

(b) locking means for locking said gate against movement;

(c) sensor loop means for producing a sensor loop signal when a vehicle is present in the vicinity of said gate;

(d) radio means for producing radio signals for actuating said gate;

(e) microprocessor means connected to said motor means and said locking means for unlocking said gate and for causing said motor means to open and close said gate in response to command signals applied to said microprocessor means, said command signals including said radio and sensor loop signals; and

(f) obstruction sensing means connected to said microprocessor means for detecting the occurrence of an obstruction during the motion of said gate;

(g) said microprocessor means being arranged to normally automatically reclose said gate a first predetermined time after opening and lock said gate substantially whenever said motor means are stopped, but upon occurrence of said obstruction to stop said gate, disable said automatic reclosing, maintain said gate unlocked for a second predetermined time, and disable said system from responding to said sensor loop signals, and cause said radio signals to produce alternate opening and closing of said gate.

6. A system for controlling a gate, comprising:

(a) motor means for driving said gate;

(b) transmission means for transmitting the motion of said motor means to said gate;

(c) locking means for locking said transmission means against rotation;

(d) microprocessor means connected to said motor means for causing said motor means to open and close said gate in response to command signals applied to said microprocessor means, said command signals including sensor loop signals;

(e) said microprocessor means including delay means arranged to release said locking means a first predetermined time before starting said motor means, and to hold said locking means released until a second predetermined time after stopping said motor means; and

(f) obstruction sensing means connected to said microprocessor means for detecting the occurrence of an obstruction during the motion of said gate;

(g) said obstruction sensing means including speed sensor means for sensing the speed of said motor means, said speed sensor means being arrange to generate an obstruction signal if the speed of said motor drops below a predetermined level during operation:

(h) said predetermined level being preset to a value below the lower normal operating speed of said motor means with any gate of a type within the design limits of said motor means;

(i) said microprocessor means being arranged to normally automatically reclose said gate a first predetermined time after opening, but upon occurrence of said obstruction to stop said gate, disable said automatic reclosing, and disable said system from responding to said sensor loop signals;

(j) command signals including radio signals; and

(k) said microprocessor means normally causing said gate to open and then automatically reclose upon receipt of said radio signals, but causing said gate to alternately close and open upon receipt of successive radio signals when an obstruction has occurred.

7. A system for controlling a gate, comprising:

(a) motor means for driving said gate;

(b) transmission means for transmitting the motion of said motor means to said gate;

(c) locking means for locking said transmission means against rotation;

(d) microprocessor means connected to said motor means for causing said motor means to open and close said gate in response to command signals applied to said microprocessor means, said command signals including sensor loop signals;

(e) said microprocessor means including delay means arranged to release said locking means a first predetermined time before starting said motor means, and to hold said locking means released until a second predetermined time after stopping said motor means; and

(f) obstruction sensing means connected to said microprocessor means for detecting the occurrence of an obstruction during the motion of said gate;

(g) said obstruction sensing means including speed sensor means associated with said motor means for sensing the speed of said motor means, said speed sensor means being arranged to generate an obstruction signal if the speed of said motor drops below a predetermined level during operation;

(h) said predetermined level being preset to a value below the lowest normal operating speed of said motor means with any gate of a type within the design limits of said motor means;

(i) said microprocessor means being arranged to normally automatically reclose said gate a first predetermined time after opening, but upon occurrence of said obstruction to stop said gate, disable said automatic reclosing, and disable said system from responding to said sensor loop signals;

(j) said microprocessor means being further arranged to normally allow said locking means to lock said transmission means substantially whenever said motor means are stopped, but to maintain said transmission means unlocked for a third predetermined time upon occurrence of said obstruction.

4,887,206

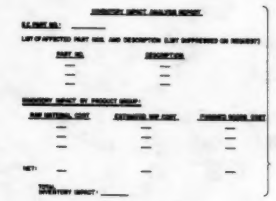
AUTOMATED SYSTEM FOR ESTIMATING IMPACT ON INVENTORY COST DUE TO AN ENGINEERING CHANGE TO A COMPONENT

Bharath Natarajan, Marietta, Ga., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Dec. 29, 1987, Ser. No. 138,782

Int. Cl.[4] G06F *15/21*

U.S. Cl. 364—401 **4 Claims**



1. An automated method implemented on a computer for evaluating inventory impact due to an engineering change to an item, said method providing for an inventory cost analysis due to the engineering change, said method automatically performing the following steps in response to a user inputting a part number identifying the item affected by the engineering change:

retrieving from a bill of materials database all parts affected by the engineering change to the item; and

displaying a list of affected part numbers and the costs due to the inventory change.

4,887,207

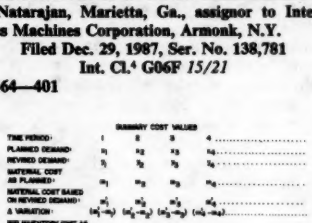
AUTOMATED SYSTEM FOR EVALUATING THE SENSITIVITY OF INVENTORY COSTS DUE TO FLUCTUATIONS IN CUSTOMER DEMAND

Bharath Natarajan, Marietta, Ga., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Dec. 29, 1987, Ser. No. 138,781

Int. Cl.[4] G06F *15/21*

U.S. Cl. 364—401 **6 Claims**



1. An automated method implemented on a computer for evaluating sensitivity of inventory cost to fluctuations in customer demand, said method providing an inventory cost analysis due to fluctuations in customer demand and comprising the steps of:

inputting planning parameter data describing inventory for a manufacturing process;

evaluating an inventory model of the manufacturing process based on said planning parameter data;

providing a data input screen for inputting revised demand values;

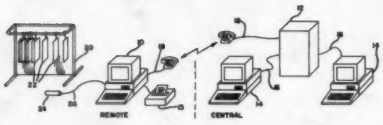
calculating inventory impact values for work-in-process inventory based on input revised demand values and the evaluation of said inventory model; and

generating a report of said inventory impact values.

4,887,208
SALES AND INVENTORY CONTROL SYSTEM

Bruce H. Schneider, R.R. 1, Fort Calhoun, Nebr. 68023, and Jerry S. Schneider, 116 S. 92nd St., Omaha, Nebr. 68114

Filed Dec. 18, 1987, Ser. No. 134,932
Int. Cl.[4] G06F *15/24*
U.S. Cl. 364—403 29 Claims



1. A system for controlling inventory and sales activity for individual items of the type which include a covering material in the items that are to be manufactured, such as furniture pieces, and having multiple and selectable components the choice and selection of which require a variation in the amount of covering material that is required to manufacture the item, such components being such things as multiple selectable fabrics, skirts of various lengths, pleats, quilting or the like, comprising:

a main computing means including a keyboard means for storing information and a memory means for storing information indicative of the available items and the components thereof at a central location, including the cost of the item and components, the immediate availability of the items and components, and the expected delivery of said items and selected components if selected and ordered by a purchaser;

at least one remote computing means, preferably located at a point of sale location, each such remote computing means having a memory means, a display and a keyboard and being adapted to have information entered concerning the purchase of an item, including the identification and quantity of a selected item and of selected components, and the identification of the purchaser;

means for communicating information between the main computing means and each of said remote computing means;

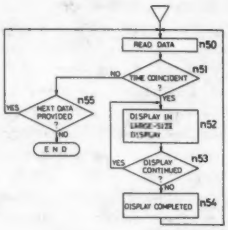
said remote computing means displaying the price of a selected item and selected components and availability of and the expected delivery date thereof in response to data being input to the remote computing means, said availability of and the expected delivery having been determined after having communicated to said main computing means via said communicating means and said main computing means having compared information relating to the amount of covering material required for the selected item and selected components with the inventory of covering material required to manufacture each such selected item and selected components at the central location;

said main computing means thereafter reserving the amount of covering material required for manufacturing the selected item and selected components, and reducing the inventory of covering material available for items and components by the amount of covering material that will be used in manufacturing the items and components selected to update the inventory of available material for future selection.

4,887,209
ELECTRONIC CASH REGISTER SYSTEM

Yasuo Sugishima, Soraku, Japan, assignor to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Nov. 9, 1987, Ser. No. 117,829
Claims priority, application Japan, Nov. 11, 1986, 61-173528; Oct. 26, 1987, 62-271236
Int. Cl.[4] G07G *1/12*
U.S. Cl. 364—405 6 Claims



1. An electronic cash register system for transferring data comprising:

an electronic cash register acting as a master machine; and

a plurality of electronic registers acting as slave machines;

said master machine including,

processing means for processing a variety of data,

reading means, operatively connected to said processing means, for reading written character or graphic data,

first storage means, operatively connected to said reading means, for storing data read by said reading means,

first panel display means, operatively connected to said first storage means, for displaying the data stored by said first storage means,

first control means, operatively connected to said processing means, for controlling said first panel display means, and

transfer means, operatively connected to said processing means, for transferring the read data to said slave machines; each slave machine including,

second storage means for storing data transferred from said master machine,

second panel display means, operatively connected to said second storage means, for displaying the data stored by said second storage means, and

second control means, operatively connected to said second panel display means, for controlling said second panel display means.

4,887,210
DEPARTMENT LEVEL SETTING IN AN ELECTRONIC CASH REGISTER

Yasuhide Nakamura, Yamatokoriyama, and Sigeyuki Yamamura, Tenri, both of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Jun. 26, 1984, Ser. No. 625,004
Claims priority, application Japan, Jun. 30, 1983, 58-120792
Int. Cl.[4] G06F *15/21*
U.S. Cl. 364—405 4 Claims

1. An electronic cash register comprising:

a CPU for performing transaction functions;

keyboard means electrically interconnected to said CPU, for introducing information therein including,

a plurality of numerical keys,

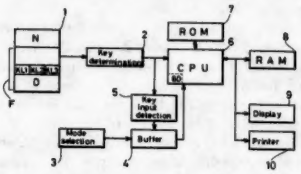
a plurality of department keys, and

a plurality of department level keys;

department memory means including a plurality of department memory sections for storing unit cost and accumulated transaction information, each section identifying a particular commodity to be sold, each section comprising

a first area for storing unit cost information related to said commodity, and a second area for storing accumulated transaction information related to said commodity,

said department memory means being divided into a plurality of department level groups, each group being associated with a particular department level key, and consisting



of a specific number of said department memory sections, said specific number being equal to the number of said department keys,

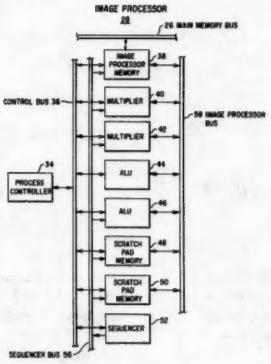
such that each of said department memory sections may be accessed by actuation of a corresponding department key in conjunction with the actuation of the particular department level key associated with said section.

4,887,211

IMAGE PROCESSOR

Geoffrey L. Thiel, Richmond; Douglas H. Hodgkiss, Sheppston, both of United Kingdom, and Hisanori Tohara, Otawara, Japan, assignors to Kabushiki Kaisha Toshiba, Kanagawa, Japan

Filed Nov. 25, 1986, Ser. No. 934,846
Claims priority, application Japan, Nov. 27, 1985, 60-264932
Int. Cl.[4] G06F *15/42*
U.S. Cl. 364—413.13 **15 Claims**



1. An apparatus for performing a plurality of operations, such as convolving, correcting and back projecting, on image data of a computerized tomography system having image data acquisition and main storage devices, comprising:

image processor memory means for storing image data;

a system clock having clock cycles;

main memory bus means for transferring said image data between said image processor memory means and the image data acquisition and main storage devices;

a plurality of operation means for performing a plurality of different arithmetic and logic functions on said image data, with said operation means each able to perform one of said functions during one of said clock cycles;

image processor bus means for interconnecting said image processor memory means and each of said plurality of operation means to permit the output of each to serve as an input for the others, said image processor memory means and said operation means each including means for selecting inputs from said image processor bus means;

process controlling means for selecting one of said pluraity of operations and for transmitting control data to said image processor memory means and to said operation means corresponding to said selected operation; and

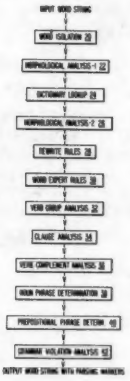
means for sequencing execution of said control data in said image processing memory means and in said operation means to provide operation of said means for selecting, during each clock cycle, to execute said functions in an order which results in performance of said selected operation.

4,887,212

PARSER FOR NATURAL LANGUAGE TEXT

Antonio Zamora, Chevy Chase; Michael D. Gunther, Gaithersburg, and Elena M. Zamora, Chevy Chase, all of Md., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Oct. 29, 1986, Ser. No. 924,670
Int. Cl.[4] G06F *5/00, 15/00*
U.S. Cl. 364—419 **7 Claims**



1. A data processing method for parsing natural language text, comprising the steps of:

inputting a human language word string;

isolating word components of said input strings;

performing a first morphological analysis of the isolated words from said input string, to strip off prefixes and suffixes;

looking up in a dictionary all the possible parts of speech for each word in said input stream;

performing a second morphological analysis on words from said input data stream which are not successfully matched in said dictionary look-up;

applying complement grammar rules to eliminate impossible parts of speech from consideration based upon the context within which the words of the input data stream occur;

resolving ambiguities in those words which require consideration of semantic as well as as syntactic characteristics;

selecting those words identified as verbs and grouping them according to valid verb group sequences;

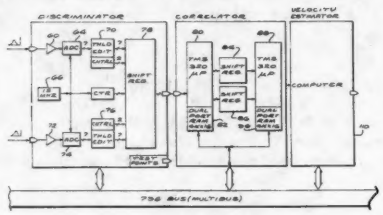
performing a clause analysis including a verb analysis complement analysis, a noun phrase determination, a prepositional phrase structure determination and a grammar violation analysis; and outputting a data structure were the words from the input data stream are associated with parts of speech and with group markings that indicate phrase structure.

4,887,213

SYSTEM FOR, AND METHODS OF, PROVIDING FOR A DETERMINATION OF THE MOVEMENT OF AN AIRBORNE VEHICLE IN THE ATMOSPHERE

Anthony E. Smart, Costa Mesa, and Roger P. Woodward, San Francisco, both of Calif., assignors to The Titan Corporation, San Diego, Calif.

Filed Jul. 31, 1987, Ser. No. 80,334
Int. Cl.[4] G01P 3/36
U.S. Cl. 364—424.01 40 Claims



1. In combination in an airborne vehicle for determining the movement of the airborne vehicle relative to the atmosphere, first means disposed on the vehicle for directing light into the atmosphere,

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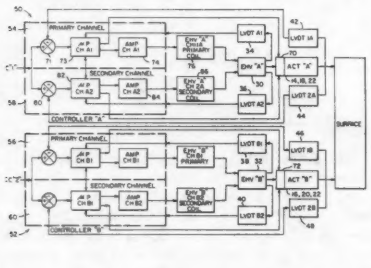
4,887,214

FLIGHT CONTROL SYSTEM EMPLOYING TWO DUAL CONTROLLERS OPERATING A DUAL ACTUATOR

Imre J. Takats, Bellevue, and George W. Aziz, Seattle, both of Wash., assignors to The Boeing Company, Seattle, Wash.

Filed Oct. 27, 1987, Ser. No. 113,882
Int. Cl.[4] G06F 15/50
U.S. Cl. 364—424.01 22 Claims



1. A hydraulic flight control system comprising:

a tandem hydraulic actuator having an actuating rod connected to a pair of pistons mounted in respective first and second cylinders;

first and second electrohydraulic servovalves controlling the flow of hydraulic fluid into and out of said first and second hydraulic cylinders, respectively, each of said electrohydraulic servovalves being controlled by a pair of actuating coils;

first controller means receiving a first flight control signal, said first controller means having a primary control channel that provides a primary output to one actuating coil of said first electrohydraulic servovalve for normally operating said first electrohydraulic servovalve, and a secondary control channel that provides a secondary output to the other actuating coil of said first electrohydraulic servovalve for operating said first electrohydraulic servovalve in response to a first enable signal;

second controller means receiving a second flight control signal, said second controller means having a primary control channel that provides a primary output to one actuating coil of said second electrohydraulic servovalve for normally operating said second electrohydraulic servovalve, and a secondary control channel that provides a secondary output to the other actuating coil of said second electrohydraulic servovalve for operating said second electrohydraulic servovalve in response to a second enabling signal; and

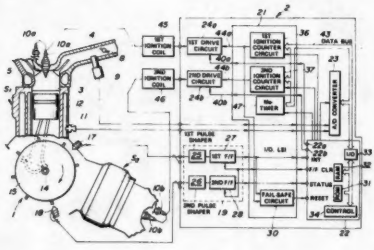
monitor and control logic means monitoring the performance of said first and second controller means, first and second electrohydraulic servovalves and actuator, said monitor and control logic means generating said first and second enable signals in the event that the primary channels of the first and second controller means are incapable of generating their respective primary outputs so that each of said electrohydraulic servovalves is operated by only one channel of its respective controller means at a time and, in the event of a malfunction in its respective primary channel or electrohydraulic servovalve connected to said primary channel, said electrohydraulic servovalve is operated by the secondary channel of its controller means.

4,887,215

METHOD OF EXAMINING OPERATION OF ELECTRONIC CONTROL SYSTEM FOR INTERNAL COMBUSTION ENGINES

Chiaki Kumagai; Shinji Juman, both of Saitama; Yutaka Kimura, and Haruhito Mitomo, both of Tokyo, all of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Jun. 25, 1986, Ser. No. 878,571
Claims priority, application Japan, Jun. 25, 1985, 60-136768
Int. Cl.[4] F02D 5/16
U.S. Cl. 364—431.04 4 Claims



1. A method of examining operation of an electronic control system for an internal combustion engine having a crankshaft, said electronic control system having a mechanism for generating indicative pulse signals indicative of angular position of said crankshaft and means for evaluating said indicative pulse signals so as to output control pulse signals for controlling an engine operation-related factor, said mechanism for generating indicative pulse signals generating each said indicative pulse signal at a time when said crankshaft is at one of predetermined angular positions, said means for evaluating outputting each said control pulse signal when said crankshaft is at a desired angular position, said method comprising the steps of:

counting continuously said indicative pulse signals so as to generate a succession of counted numbers, each said counted number representing the number of said indicative pulse signals continuously generated during a time from an occurrence of one said control pulse signal to an occurrence of next said control pulse signal, each said counted number varying dependent upon operating conditions of said engine, and varying the timing of the outputs of said control pulse signal by said means for evaluating according to said varying counted numbers;

testing whether or not said succession of counted numbers meets one of predetermined conditions by comparing a combination of the latest counted numbers with predetermined combination of numbers; and

evaluating results of said testing so as to examine operation of said control system.

4,887,216

METHOD OF ENGINE CONTROL TIMED TO ENGINE REVOLUTION

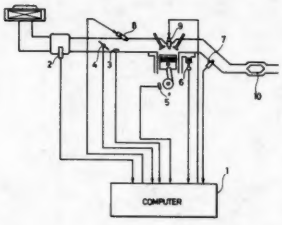
Mikihiko Ohnari, Kokubunji; Teruji Sekozawa, Kawasaki; Motohisa Funabashi, Sagamihara; Takeshi Atago, Katsuta, and Makoto Shioya, Tokyo, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

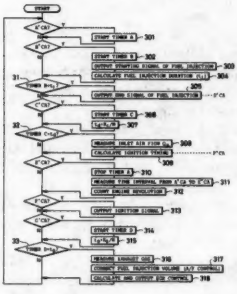
Filed Sep. 3, 1987, Ser. No. 92,613

Claims priority, application Japan, Sep. 3, 1986, 61-205994

Int. Cl.[4] F02M 51/00; F02D 41/04

U.S. Cl. 364—431.06 20 Claims





11. A method of engine control timed to reference engine crank angles of an engine revolution of an internal combustion engine, comprising, for each cylinder of the engine, the steps of:

calculating fuel injection volume to a cylinder corresponding to an inlet air volume to said cylinder predicted from a measured inlet air volume of another cylinder nearest to the inlet cycle of said cylinder;

injecting said fuel injection volume calculated in said calculating step to an injector upon occurrence of a first reference engine crank angle position measured relative to a predetermined reference point;

measuring inlet air volume to said cylinder upon occurrence of a second reference engine crank angle position measured relative to said predetermined reference point; and

calculating an ignition timing corresponding to said measured inlet air volume to said cylinder.

4,887,217

PROCESS FOR MANUFACTURING PAINTS

Charles J. Sherman, Dyer, and Kenneth S. Simone, Schererville, both of Ind., assignors to The Sherwin-Williams Company, Cleveland, Ohio

Filed Jan. 4, 1985, Ser. No. 688,797

Int. Cl.[4] B01F 5/10

U.S. Cl. 364—468 3 Claims

1. In a process for the manufacture of paint to match the color of a standard paint within a specified color tolerance wherein the process involves the use of a spectrophotometer or a colorimeter and comprises:

(a) mixing in a vessel the components of a paint, said components comprising a liquid binder for the paint, solvent for the paint, and colorants for the paint; and

(b) shading the paint during its manufacture by the addition of additional colorants in the form of dispersions or solutions to match the color of the specified standard paint within the given color tolerance, the improvement which comprises utilizing as the shading procedure a process which comprises:

(1) determining correction factors describing the relationship between the X, Y and Z tristimulus readings of wet paints and the corresponding X, Y and Z tristimulus values of dry paints prepared from said wet paints; and

(2) measuring and determining by the spectrophotometer or colorimeter the X, Y and Z values of the wet paint being manufactured;

(3) calculating the theoretical X, Y and Z values of a dry paint sample of the paint being manufactured according to the formulas:

$$X_{(theoretical\ dry)} = \frac{X(\text{wet paint being manufactured})}{X \text{ correction factor}}$$

$$Y_{(theoretical\ dry)} = \frac{Y(\text{wet paint being manufactured})}{Y \text{ correction factor}}$$

$$Z_{(theoretical\ dry)} = \frac{Z(\text{wet paint being manufactured})}{Z \text{ correction factor}}$$

and

(4) comparing the theoretical X, Y and Z dry values of the paint being manufactured to the X, Y and Z values of the standard dry paint and calculating the quantities of components to be added to the paint to bring the paint within the required color tolerance; and

(5) adding to the paint being manufactured the quantities of components calculated in step (4); and

(6) repeating steps (2) through (5) at least once in the event the paint is not within the specified color tolerance until the paint being manufactured is within said color tolerance.

4,887,218

AUTOMATED PRODUCTION RELEASE SYSTEM

Bharath Natarajan, Marietta, Ga., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Dec. 1, 1987, Ser. No. 127,334

Int. Cl.[4] G06F 15/20, 15/46

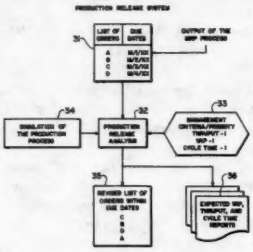
U.S. Cl. 364—468 9 Claims

1. An automated production release system for implementation on a computer, said system providing for the production release planning information for a manufacturing environment to aid a user to make decisions that will improve the production release process, comprising the steps of:

prompting the user to define management priorities between maximizing throughput, minimizing work-in-process inventory and minimizing manufacturing cycle time;

simulating the manufacturing environment using a predefined set of order release and dispatching rules to test for varying alternatives in the production release process;

selecting the result of the various alternatives which optimize the management priorities input by the user; and



generating a revised sequence of production release orders for the manufacturing environment.

4,887,219

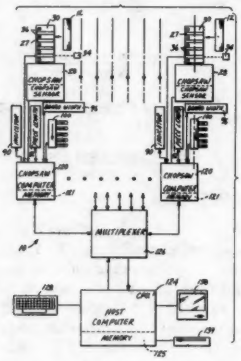
BOARD CUT-OFF SAW ASSEMBLY

Michael Strauser, Walla Walla, Wash., assignor to Strauser Manufacturing, Inc., Walla Walla, Wash.

Filed Feb. 2, 1988, Ser. No. 151,434

Int. Cl.[4] G05B *13/00*; B27B *27/10*

U.S. Cl. 364—474.09 **20 Claims**



1. A manual board cut-off saw assembly for enabling a cut-off saw operator to cross cut a plurality of elongated boards at desired locations along their length and to remove defective sections from the boards based upon the observation of the operator as to the location of the defective sections, comprising:

a manually operated cut-off saw for enabling the operator to cross cut the elongated boards intermediate board ends to subdivide the boards into selected length wood pieces and to remove defective sections from the elongated boards;

means for supporting the elongated boards upstream of the cut-off saw as the elongated boards are being cut;

a plurality of longitudinally spaced selectable mechanical board stops downstream of the cut-off saw for enabling the operator to manually place an end of the board against a selected stop preparatory to cutting a wood piece from the board;

independent measuring means extending downstream of the cut-off saw and separate from the mechanical board stops for measuring the length of each wood piece as the piece is being cross cut from the elongated board having its end placed against a selected stop and in response thereto generating an electrical signal representative of an accurate measurement of the length of each wood piece;

sorting means responsive to the measured length of each wood piece for sorting the wood pieces according to their lengths; and

wood accumulation processing means responsive to the electrical signals for storing information in real time concerning the number of pieces of each length cut from the plurality of boards.

4,887,220

PARAMETER INITIALIZING METHOD FOR A PROGRAMMABLE MACHINE CONTROLLER

Nobuyuki Kiya, Hachioji; Shuji Toriyama, Kawasaki, and Yoshiharu Saiki, Hachioji, all of Japan, assignors to Fanuc Ltd., Kawasaki, Japan

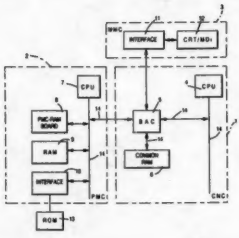
PCT No. PCT/JP87/00264, § 371 Date Dec. 23, 1987, § 102(e) Date Dec. 23, 1987, PCT Pub. No. WO87/06728, PCT Pub. Date Nov. 5, 1987

PCT Filed Apr. 24, 1987, Ser. No. 143,859

Claims priority, application Japan, Apr. 28, 1986, 61-96881

Int. Cl.[4] G06F *15/46*

U.S. Cl. 364—474.11 **7 Claims**



1. A parameter initializing method for a programmable machine controller performing a control operation using predetermined memory contents stored in a read-only memory cassette, said method comprising:

(a) storing in an initial value random access memory of said programmable machine controller initial values of various control parameters of said programmable machine controller;

(b) transferring the initial values into a blank memory region of a debugging random access memory having predetermined memory contents;

(c) transferring to and storing in said read-only memory cassette said predetermined memory contents in said debugging random access memory and the initial values of said various control parameters; and

(d) initializing said various control parameters using the initial values stored in said read-only memory cassette, in response to a command for parameter initialization, after said programmable machine controller has been loaded with said read-only memory cassette.

4,887,221

COMPUTER CONTROLLED HONING MACHINE USING LOOK UP TABLE DATA FOR AUTOMATIC PROGRAMMING

James K. Davis, Fenton; Wayne W. Althen, St. Louis County; Daniel R. Cloutier, Clayton, and Gerry R. Schnitzler, Oakville, all of Mo., assignors to Sunnen Products Company, St. Louis, Mo.

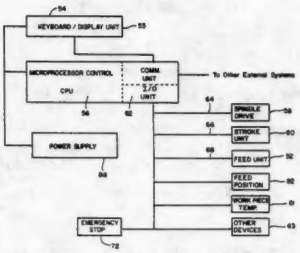
Filed Sep. 25, 1987, Ser. No. 100,726

Int. Cl.[4] G06F *15/00*

U.S. Cl. 364—474.23 **24 Claims**

1. Control means for establishing, setting up and monitoring

the operating conditions of a machine tool as it operates on the surface of a workpiece, the machine tool having machine controls thereon the control of which is based on the entry by the machine operator of blueprint information as to the workpiece including information as to a beginning surface size, a final surface size, and the workpiece material comprising a computer operable on the blueprint information entered by the operator and look up table data for controlling the setting up and operation of the controls for said machine tool, input means operatively connected to said computer for inputting



the blueprint information entered by the operator, a data storage operatively connected to said computer for storing data including look up table data, said computer using the input blueprint information and the stored look up table data to calculate the operating conditions for the machine tool including selecting the tooling to be used for the machine tool, said calculations being independent of further actions by the operator, and a computer output operatively connected to said computer and to the machine controls to set up and operate the machine controls to establish and carry out the machine tool operating conditions.

4,887,222

METHOD FOR CONTROLLING OPERATION OF INDUSTRIAL ROBOT

Norikisa Miyake, Matsudo, and Masaki Sumita, Yachiyo, both of Japan, assignors to Hitachi, Ltd., Tokyo and Hitachi Keiyo Engineering Co., Ltd., Narashino, both of, Japan

Filed Jun. 29, 1988, Ser. No. 213,137
Claims priority, application Japan, Jul. 1, 1987, 62-162358
Int. Cl.[4] G05B *19/18, 19/42*
U.S. Cl. 364—513 **5 Claims**

1. A control method for an industrial robot having a plurality of joints, cooperation of said joints allowing a hand or an end effector attached to the hand to perform necessary operation, comprising the steps of:

representing a position and orientation of a hand effecting point relatively determined with respect to said hand or said end effector by a predetermined coordinate system for describing said necessary operation;

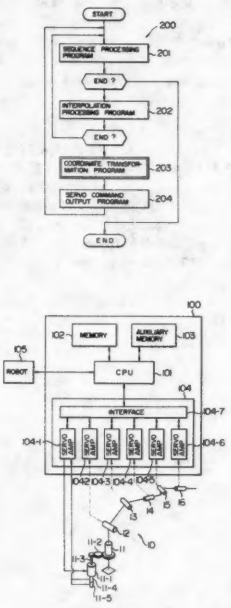
deriving respective displacement values of said joints corresponding to said position and orientation represented by said coordinate system; and

making said hand effecting point perform said necessary operation on a basis of said derived displacement values,

wherein said displacement deriving step comprises the steps of:

approximately deriving displacement of at least that one joint by using an approximate solution which does not affect at least one parameter among a plurality of parameters representing the position and orientation of said hand effecting point; and

strictly deriving displacement values of remaining joints among said plurality of joints on a basis of said approxi-



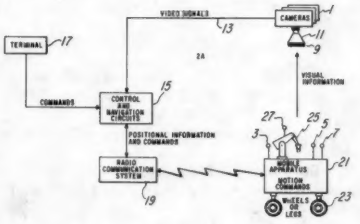
mately derived displacement value for said plurality of parameters excluding at least one parameter.

4,887,223

VISUAL NAVIGATION SYSTEM FOR A MOBILE ROBOT HAVING CAPABILITIES OF REGENERATING OF HIDDEN IMAGES

Donald J. Christian, Richardson, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Continuation of Ser. No. 772,061, Aug. 30, 1985, abandoned.
This application Jul. 20, 1988, Ser. No. 222,322
Int. Cl.[4] G06F *15/50*
U.S. Cl. 364—518 **34 Claims**



1. A visual navigation system with a regeneration capability comprising:

control and navigation means for obtaining the position of a mobile robot, including:

a predefined visually detectable pattern on the mobile robot;

camera means for obtaining a visual image of said pattern;

control and navigation circuit means electrically connected to the camera means, for regenerating portions of the predefined visually detectable pattern which are hidden from the field of view of the camera means;

wherein the X-Y position and heading of the mobile robot are determined by the control and navigation circuit means from the visual image, and said regenerated portions thereof, of the predefined visually detectable pattern.

4,887,224

IMAGE DATA PROCESSING APPARATUS CAPABLE OF HIGH-SPEED DATA ENCODING AND/OR DECODING

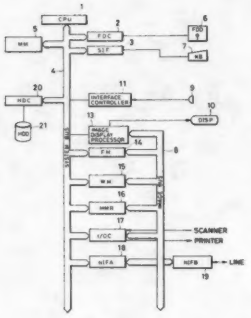
Tatsuo Okano, Yokohama, and Katsutoshi Hisada, Tokyo, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Aug. 24, 1987, Ser. No. 88,271

Claims priority, application Japan, Aug. 28, 1986, 61-202003; Aug. 28, 1986, 61-202004; Nov. 4, 1986, 61-262454; Nov. 5, 1986, 61-264363

Int. Cl.[4] H04N *1/41*

U.S. Cl. 364—518 **12 Claims**



1. An image data encoding apparatus comprising:

memory means for storing a page of image data to be encoded;

encoding means for encoding the image data read out from said memory means;

transfer means for DMA transfer of the image data from said memory means to said encoding means, said transfer means being operable to intermittently DMA-transfer a page of image data in increments of a predetermined amount; and

control means for causing said encoding means to intermittently perform encoding of the image data in synchronization with the intermittent DMA transfer of the image data by said transfer means.

4,887,225

METHOD AND DEVICE FOR CONTROLLING EXPOSURE BEAMS

Koji Yao, Osaka, Japan, assignor to Danippon Screen Mfg. Co., Ltd., Japan

Filed May 12, 1986, Ser. No. 861,721

Claims priority, application Japan, May 24, 1985, 60-112358; Jun. 11, 1985, 60-127358

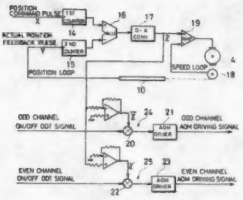
Int. Cl.[4] G06K *1/20*

U.S. Cl. 364—518 **10 Claims**

4. A device for controlling exposure beams for printing-/recording desired images on phototsensitive material by performing scanning in main and vertical scanning directions while on-off controlling said exposure beams, said device comprising:

feed pitch error detecting means for detecting vertical scanning direction feed pitch errors of said exposure beams; and

printing spot diameter change means for changing diameters of printing spots, defined on said photosensitive material



by said exposure beams, on the basis of said detected feed pitch errors, thereby to correctly orient edges of traces formed by said printing spots along the main scanning direction.

4,887,226

DOT PRINTING DEVICE CAPABLE OF PRINTING UNDERLINE TOGETHER WITH CHARACTERS

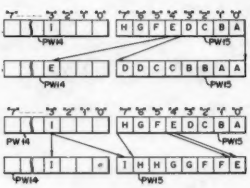
Ryozo Oba, 130 Fukara, Susono-shi, Shizuoka-ken, Japan

Filed Dec. 31, 1984, Ser. No. 687,597

Claims priority, application Japan, Jan. 17, 1984, 59-6065

Int. Cl.[4] B41J *3/02*; G06F *15/40*; G09G *1/06*

U.S. Cl. 364—519 **8 Claims**



5. A dot printing device comprising:

a head having N dot printing elements arranged in a row;

head driving means for selectively energizing said dot printing elements according to dot data;

head moving means for causing movement of said head relative to paper perpendicularly to said row;

paper feeding means for feeding paper parallel to said row;

character generating means;

memory means for storing character designation data and underline data in respective assigned memory locations; and

data processing means for reading out to said memory in a normal printing mode, according to first input data including character designation data and underline data, character data designated by said character designation data in said first input data and constituted by a plurality of N-bit dot data from said character generating means and transferring said plurality of N-bit dot data corresponding to said character data and underline data from said memory means to said head driving means for printing said character data and also printing an underline with a first predetermined number of dot printing elements among said N dot printing elements, and also for reading out to said memory means in a double height printing mode, according to second input data including character designation data, underline data and double height data, character data designated by said character designation data in said second input data and constituted by a plurality of N-bit dot data from said character generating means, transferring N-bit dot data equal to N-bit dot data which is in-

cluded in 2N-bit dot data obtained by expanding selected bits in each of said plurality of N-bit dot data and which correspond to an upper half portion of said character data from said memory means to said head driving means for printing said upper half portion of said character data, then reading out to said memory means character data designated by said character designation data in said second input data and constituted by a plurality of N-bit dot data from said character generating means and transferring N-bit dot data equal to N-bit dot data which is included in 2N-bit dot data obtained by expanding selected bits of each of said plurality of N-bit dot data and which correspond to a lower half portion of said character data and dot data representing an underline from said memory means to said head driving means;

said data processing means including means for generating the N-bit dot data which corresponds to the upper half portion of said character data by replacing underline data at its assigned memory location with selected character designation data so that the N-bit dot data corresponding to the upper half portion of said character data consists of character designation data, and for generating the N-bit dot data which corresponds to a lower half portion of said character data and dot data representing an underline by retaining the underline data in its assigned memory location and replacing character designation data with underline data at a selected memory location;

whereby said lower half of said character data is printed in a position matched to said upper half portion of character data printed in the preceding printing cycle while also printing an underline with a second predetermined number of lower dot printing elements greater in number than said first predetermined number among said N dot printing elements.

4,887,227

IMAGE INPUT PROCESSOR

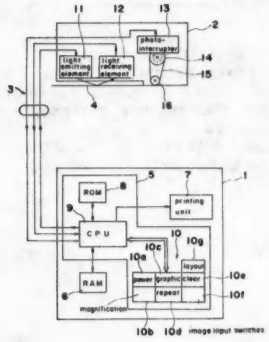
Hiroshi Tsujioka, Nara; Shigeo Yoneda, Yamatokoriyama, and Yasuhumi Yatsuzuka, Nara, all of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Oct. 20, 1987, Ser. No. 110,470

Claims priority, application Japan, Oct. 20, 1986, 61-249828; Oct. 20, 1986, 61-250404; Oct. 20, 1986, 61-250405; Oct. 20, 1986, 61-250409; Oct. 20, 1986, 61-250410; Oct. 20, 1986, 61-250411

Int. Cl.[4] G06F *15/626*

U.S. Cl. 364—519 **8 Claims**



1. An image input processor for reading a line of read character information contained within a reading width having a predetermined width and printing the read character information, comprising:

character reading means for reading a plurality of characters from the line of the read character information;

judging means for judging whether the height of at least one of said plurality of characters of the read character information within the reading width exceeds the predetermined width and comparing the portion of the read character information within the reading width of the line to a predetermined value; and

printing means for printing the characters in the line of the read character information when the portion of the read character information within the reading width is over the predetermined value, and prohibiting the line of the read character information from being printed when the amount of the read character information within the predetermined width is below the predetermined value.

4,887,228

METHOD FOR FILLING SURFACE PARTS OF AN IMAGE WITH A SURFACE PATTERN

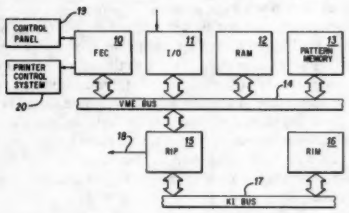
Rob W. Robert, Venray, Netherlands, assignor to Oce-Nederland B.V., Venlo, Netherlands

Filed Jun. 8, 1987, Ser. No. 59,048

Claims priority, application Netherlands, Jun. 9, 1986, 8601488

Int. Cl.[4] G06F *15/66*

U.S. Cl. 364—521 **11 Claims**



11. A device for filling with a surface pattern a surface part of an image stored in the form of a bit-representation comprising:

a front end-controller for controlling a front-end system;

an I/O processor connected to a computer or to a data network;

at least one memory for storing data supplied by the I/O processor for a page to be assembled wherein a portion thereof comprises a pattern memory for storing the bit-representations of the typographic characters and basic patterns for generating the surface pattern used to fill the surface part;

a raster image memory for storing the bit-representation of a complete page to be printer;

a raster image processor for expanding the data for a page to be assembled, directing the bit-representation thereof in the raster image memory and combining it with the bit-representation of the basic pattern to form a resulting bit-representation, and for converting the resulting bit-representation into a serial pixel-bit stream for supply to a raster output scanner;

a first bus system for connecting together the front-end controller, the I/O processor, the memory and the raster image processor; and

a second bus system for connecting the raster image processor to the raster image memory.

4,887,229

METHOD AND APPARATUS FOR A NON-CONTACT MEASURING OF A TEMPERATURE OF A BODY

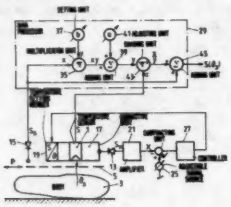
Hardy P. Weiss, Hütter, Switzerland, assignor to Martin Lehmann, Wohlan, Switzerland

Filed Jun. 22, 1987, Ser. No. 64,464

Claims priority, application Switzerland, Jun. 20, 1986, 2503/86

Int. Cl.[4] G01J 5/24, 5/62

U.S. Cl. 364—557 27 Claims



1. A measuring apparatus for a non-contact measurement of a temperature of a body, the apparatus comprising:

a first temperature sensor means for measuring a temperature of heat radiation received from a direction toward said body;

a heat radiation chopper means disposed in front of a heat input region of the first temperature sensor means for chopping heat radiation;

at least one second temperature sensor means arranged adjacent at least one of the chopper means;

a multiplication unit connected after an output of the at least one second temperature sensor means wherein, a signal of an adjustable value signal is fed to the second input of the multiplication unit, an output of the multiplication unit is fed to a summation unit, an adjustable value signal is fed as a second input to said summation unit, an output of the first temperature sensor means is transmitted to a numerator input of a dividing unit, a denominator input of the dividing unit is fed with an output signal of the summation unit; and

wherein an output of the dividing unit as well as an output from the second temperature sensor means are transmitted to a summation unit, and an output of which represents the temperature of the body.

4,887,230

CURSOR DISPLAY APPARATUS

Yasuhiro Noguchi; Hitoshi Yamada, both of Hitachi, and Yukio Funyu, Kitaibaraki, all of Japan, assignors to Hitachi, Ltd., Tokyo and Hitachi Process Computer Engineering, Inc., Hitachi, both of, Japan

Filed Feb. 17, 1988, Ser. No. 156,847

Claims priority, application Japan, Feb. 18, 1987, 62-33424

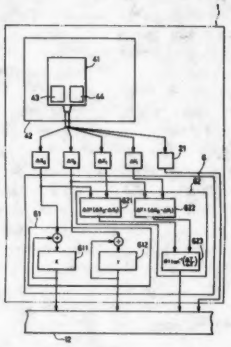
Int. Cl.[4] G06F 3/033, 15/20

U.S. Cl. 364—560 2 Claims

1. A cursor display apparatus for displaying a cursor for showing an input coordinate position on a display device, comprising:

a coordinate input device moveable on a surface for outputting coordinate values, in ordinate and abscissa directions, of a cursor position on said display device, including a first movement detecting sensor for detecting first movement amounts ΔXo, ΔYo of said coordinate input device in horizontal and vertical directions corresponding to the extent of movement of the first movement detecting sensor on said surface, and a second movement detecting sensor for detecting second movement amounts ΔX1, ΔY1, of said coordinate input device in horizontal and vertical directions corresponding to the extent of movement of the second movement detecting sensor on said surface;

an input controller coupled to said coordinate input device and having a first movement amount calculating circuit which calculates a cursor moement amount X in the abscissa direction on said display device based on the movement amounts ΔXo, ΔX1 of said coordinate input device in the horizontal direction detected by said first movement



detecting sensor, a second movement amount calculating circuit which calculates a cursor movement amount Y in the ordinate direction on said display device based on the movement amounts ΔYo, ΔY1, in the vertical direction detected by said second movement detecting sensor and a rotation amount calculating circuit which calculates a rotation angle θ of said cursor displayed on said display device based on the relationship

$$\theta = \tan^{-1}\left(\frac{\Delta Y0 - \Delta Y1}{\Delta X0 - \Delta X1}\right)$$

and

a calculating device coupled to said input controller for outputting to said display device cursor data based on said movement amounts X, Y and said rotation angle θ on said display device based on the output signals from said input controller.

4,887,231

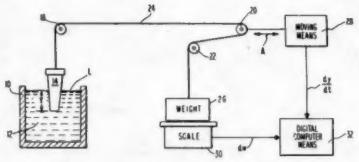
DETERMINATION OF TURBINE BLADE CROSS-SECTIONAL AREA

Phillip R. Ratliff, Winston-Salem, N.C., and George A. Bises, Winter Springs, Fla., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Dec. 24, 1987, Ser. No. 137,701

Int. Cl.[4] G01F 17/00; G01G 5/02

U.S. Cl. 364—564 6 Claims



4. Apparatus for determining the cross-sectional area of

selected points along a three-dimensional body having a complex shape, comprising:

a tank containing a volume of fluid;

means for immersing the body into said tank at a predetermined rate so that successive ones of said points are immersed into said fluid, wherein said immersing means comprises:

means for moving the body;

means for suspending the body from said moving means, said suspension means including a wire attached at one end thereof to the body, a weighted object corresponding to at least the actual weight of the body, said weighted object being attached to the other end of said wire, and pulley means attached to said moving means, said wire being led through said pulley means to transmit the motion of said moving means to the body thereby immersing the body in said fluid;

means for measuring a representation of the change in sid volume displaced by the body per unit time as the body is immersed between respective ones of said points within said tank; and

means for calculating quotients of said measured change and said predetermined rate;

wherein said quotients correspond to the cross-sectional area of the body between the selected points along its length.

4,887,232

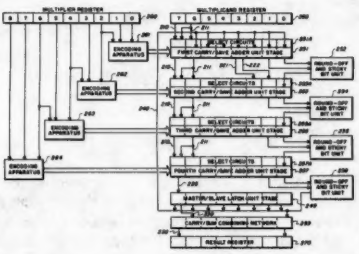
APPARATUS AND METHOD FOR PERFORMING A SHIFT OPERATION IN A MULTIPLIER ARRAY CIRCUIT

Gilbert M. Wolrich, Framingham; Edward J. McLellan, Milford, and Robert A. J. Yodlowski, Hudson, all of Mass., assignors to Digital Equipment Corporation, Maynard, Mass.

Filed May 15, 1987, Ser. No. 50,749

Int. Cl.[4] G06F *7/38, 7/52*

U.S. Cl. 364—754 **19 Claims**



1. Apparatus for shifting a group of logic signals a controllable number of positions to the right, said apparatus comprising:

a multiplier unit including;

a first operand register for storing a multiplicand operand,

a second operand register for storing a multiplier operand,

a plurality of sequential stages including carry/save adder units, each of said carry/save adder unit stages receiving logic signals from a next previous stage and from said first operand register,

an encoding unit coupled to each stage and responsive to logic signals from selected positions of said second operand register, said encoding unit providing control signals to said coupled carry/save adder stage, said control signals causing said coupled carry/save adder stage to process logic signals from a next previous carry/save adder unit stage and from said first operand register in a predetermined manner, wherein paths between a carry/save adder unit stage and a next sequential carry/save adder unit stage include signal paths for shifting logic signals at least one bit position; and

conversion means for converting a shift operand indicating a number of positions said group of logic signals is to be shifted into shift signals to be applied to said encoding means, said group of logic signals being entered in said first operand register, wherein control signals generated in response to said shift signals cause said group of logic signals to be shifted said number of positions.

4,887,233

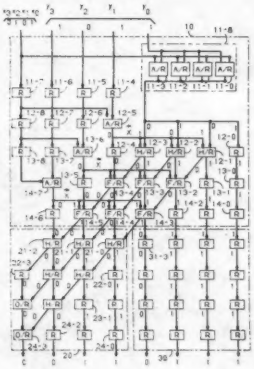
PIPELINE ARITHMETIC ADDER AND MULTIPLIER

Glenn L. Cash, Matawan; Mehdi Hatamian, Oldbridge, and Adrianus Ligtenberg, Rumson, all of N.J., assignors to American Telephone and Telegraph Company, AT&T Bell Laboratories, Murray Hill, N.J.

Filed Mar. 31, 1986, Ser. No. 846,145

Int. Cl.[4] G06F *7/52, 7/50*

U.S. Cl. 364—757 **22 Claims**



1. A pipeline adder for developing a sum of two numbers having M bits each, where M is a number, comprising:

a plurality of cells arranged in rows and columns, with each cell operating on data signal related to said two numbers to develop output data signals related to said two numbers, with the first row of cells being responsive to said two numbers, each subsequent row of cells being responsive to developed data signals emanating solely from the immediately previous row of cells, and the last row of cells developing said sum of said two numbers;

N-1 least significant cells in each of said rows providing a preselected delay, N being a number, and M-N+1 next higher significance cells in each of said rows performing arithmetic addition, where N is the row number beginning with 1;

each of said higher significance cells that perform arithmetic addition in rows other than the first row having a sum input connected to a sum signal output developed by a cell in the same column and in the immediately preceding row, and having a carry input connected to a carry signal output developed by a cell in a column of one bit lower significance and in the immediately preceding row, with each of said higher significance cells that perform arithmetic addition developing a binary sum signal output responsive to its inputs and a carry signal output responsive to its inputs; and

the most significant cell in the third and each subsequent of said rows, responsive to an output signal of a most significant cell in the immediately previous row and the same column and to a carry signal from an arithmetic addition cell in said immediately previous row and in a column of one bit lower significance, developing a cell output signal

in accordance with the OR function of said cell's input signals.

4,887,234

PORTABLE ELECTRONIC DEVICE WITH PLURAL MEMORY AREAS

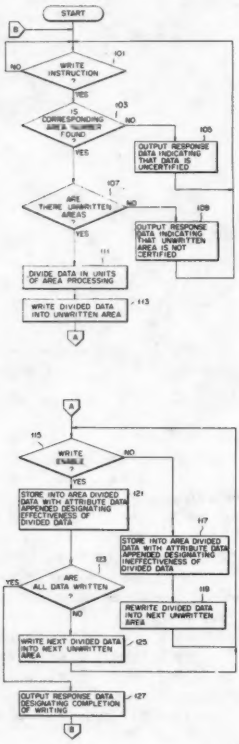
Yasuo Iijima, Yokohama, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Continuation of Ser. No. 919,243, Oct. 15, 1986, abandoned. This application Jan. 13, 1989, Ser. No. 298,261

Claims priority, application Japan, Nov. 30, 1985, 60-269626; Nov. 30, 1985, 60-269630; Jan. 7, 1986, 61-213

Int. Cl.[4] G06F *12/16*; G06K *5/00*

U.S. Cl. 364—900 **6 Claims**



1. A portable electronic device detachably connected to a host system, comprising:

first memory means, divided into a plurality of areas, for storing write data in each area;

second memory means for storing, in accordance with the divided areas, a unit data length defining the length of data to be written in the respective divided areas of said first memory means;

means for receiving write data supplied from said host system;

means for dividing the received write data in accordance with the unit data length corresponding to the divided areas in which the received write data are to be stored;

means for storing the divided data in said first memory means; and

means for repetitively operating said dividing means and storing means until all of the divided received write data are stored in said first memory means.

4,887,235

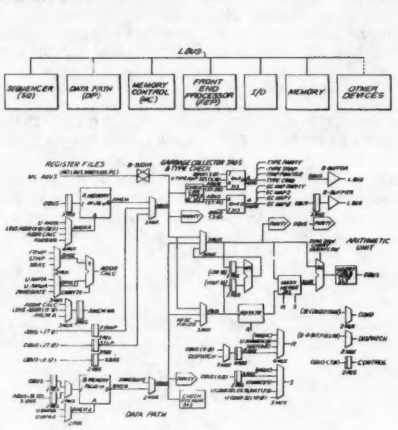
SYMBOLIC LANGUAGE DATA PROCESSING SYSTEM

John T. Holloway, Belmont; David A. Moon, Cambridge; Howard I. Cannon, Sudbury; Thomas F. Knight; Bruce E. Edwards, both of Belmont, and Daniel L. Weinreb, Arlington, all of Mass., assignors to Symbolics, Inc., Cambridge, Mass.

Continuation of Ser. No. 450,600, Dec. 17, 1982, abandoned. This application Dec. 3, 1987, Ser. No. 129,921

Int. Cl.[4] G06F *9/00*

U.S. Cl. 364—900 **6 Claims**



1. In a method of data processing in a processor programmable in a symbolic programming language of the type including LISP and having automatic memory reclamation, wherein the processor repeatedly applies address words to gain memory to write data structures into main memory and read data structures from main memory to perform operations thereon, and the processor allocates previously used portions of main memory for writing data structures by reclaiming same, the improvement wherein the step of reclaiming comprises:

a. defining address regions in main memory including a main space and a relatively smaller subsidiary space;

b. writing new data structures into subsidiary space until it is full; and

c. reclaiming subsidiary space when it is full by

i. detecting the writing of a data structure into main space having a pointe into subsidiary space;

ii. adding memory locations of pointer detected in step (i) to a given data structure;

iii. halting operation of the processor;

iv. locating all pointers to subsidiary space by referencing the given data structure;

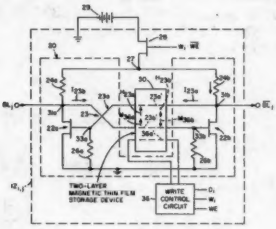
v. locating useful data structures in subsidiary space from the pointers located in step (iv) and;

vi. copying the located useful data structures into main space until there are no further pointers into subsidiary space.

4,887,236
NON-VOLATILE, RADIATION-HARD, RANDOM-ACCESS MEMORY

Ernst F. R. A. Schloemann, Weston, Mass., assignor to Raytheon Company, Lexington, Mass.

Filed May 29, 1987, Ser. No. 57,089
Int. Cl.[4] G11C *11/40, 11/10*
U.S. Cl. 365—173 **73 Claims**

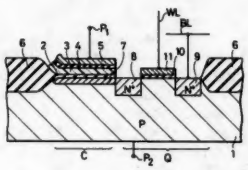


1. A memory element comprising:
means for providing a flip-flop circuit; and
means for inducing an asymmetrical response in said flip-flop circuit means comprising:
(i) at least one thin layer comprised of a magnetic material disposed to have one of a pair of mutually orthogonal remanent magnetization states; and
(ii) means connected to said flip-flop means for responding to the remanent magnetization in said thin layer of magnetic material.

4,887,237
SEMICONDUCTOR MEMORY DEVICE

Tetsuro Matsumoto, Tachikawa, Japan, assignor to Hitachi, Ltd., Tokyo, Japan

Division of Ser. No. 925,223, Oct. 31, 1986, Pat. No. 4,740,920, which is a division of Ser. No. 530,079, Sep. 7, 1983, Pat. No. 4,638,460. This application Mar. 29, 1988, Ser. No. 174,974
Claims priority, application Japan, Sep. 22, 1982, 57-163888
Int. Cl.[4] G11C *11/24*
U.S. Cl. 365—182 **12 Claims**

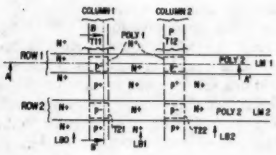


1. A semiconductor memory device comprising:
a dynamic memory cell which includes a series connection comprising a switching MISFET and a storage capacitor connected in series, said storage capacitor comprising a first electrode, a silicon nitride film, and a second electrode;
a bit line which is connected to one of said series connection;
amplifier means which is coupled to said bit line and which supplies a signal having one level of a predetermined high level and a predetermined low level to said bit line;
a first terminal which is coupled to said amplifier means and which is supplied with a first reference voltage having a first level substantially identical with said predetermined high level;
a second terminal which is coupled to said amplifier means and which is supplied with a second reference voltage having a second level substantially identical with said predetermined low level; and
a third terminal which is connected to the other end of said series connection and which supplies a voltage which is greater than said second level but less than said first level to said other end of said series connection so that a voltage of said storage capacitor to be stored between said first electrode and said second electrode has a smaller absolute value than an absolute value of said first level,
wherein said switching MISFET has a region connected to said second electrode of said storage capacitor and a region connected to said bit line, and wherein said first electrode of said storage capacitor is connected to said third terminal.

4,887,238
NON-VOLATILE MEMORY WITH FLOATING GRID AND WITHOUT THICK OXIDE

Albert Bergemont, La Tronche, France, assignor to SGS Thomson-Microelectronics SA, Gentillye, France

PCT No. PCT/FR87/00353, § 371 Date May 16, 1988, § 102(e) Date May 16, 1988, PCT Pub. No. WO88/02172, PCT Pub. Date Mar. 24, 1988
PCT Filed Sep. 11, 1987, Ser. No. 207,050
Claims priority, application France, Sep. 16, 1986, 86 12940
Int. Cl.[4] G11C *11/40*; H01L *29/78*
U.S. Cl. 365—185 **7 Claims**



1. A memory comprising an array of word lines that connect cells in rows and bit lines that connect cells in columns, the word lines being conductors used to designate a specific row of cells and the bit lines being conductors used to transmit a piece of information on the logic state of the cells that are connected to them, each cell comprising a floating grid transistor having a floating grid, a control electrode connected to a word line, and source and drain electrodes, one connected to a first bit line, and the other connected to another bit line adjacent to the first bit line, this other bit line being itself connected to a source or drain electrode of a transistor of a column adjacent to a column of which the considered cell forms a part, wherein the transistors of one group belonging to two adjacent rows and two adjacent columns are arranged as follows:
the floating grid of each transistor essentially consists of a conductive rectangle located above a zone having a first type of conductivity constituting the channel of the transistor;
the channels of two adjacent transistors of the same column are separated by a region having the same type of conductivity as the channels;
the channels of two adjacent transistors of the same row are adjacent to and separated by a common region having an opposite type of conductivity, which acts as a source for one of the transistors and a drain for the other transistor;
there is no thermally grown thick oxide to separate the transistors from one another either in a same row or in a same column.

4,887,239

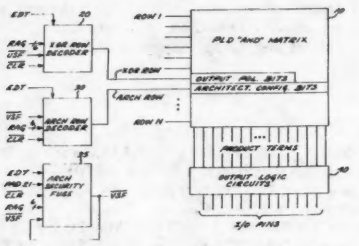
ONE-TIME PROGRAMMABLE DATA SECURITY SYSTEM FOR PROGRAMMABLE LOGIC DEVICE

John E. Turner, Beaverton, Oreg., assignor to Lattice Semiconductor Corporation, Hillsboro, Oreg.

Continuation-in-part of Ser. No. 707,666, Mar. 4, 1985. This application Jul. 7, 1986, Ser. No. 882,602

Int. Cl.[4] G11C *11/34*; G06F *11/00*

U.S. Cl. 365—185 **16 Claims**



1. A security circuit for selectively preventing the erasure or programming of predetermined electrically erasable memory cells in an integrated circuit programmable logic device when such programmable logic device is in an edit mode wherein selected electrically erasable cells of the programmable logic can be erased, programmed, or interrogated, comprising:

first electrically erasable means for storing first security data having first and second states;

first latching means responsive to said first security data for providing a first latching means output having first and second states, said latching means output having the same state as said first security data except during the edit mode when said first latching means output is latched to the same state of said first security data prior to the programmable logic device being in the edit mode;

first programming means responsive to first control signals and said first latching means output for electricity erasing said first electrically erasable means to initialize said first security data to said first state and for programming said first security data to said second state in a selected edit mode, said programming means being disabled from resetting said first security data to said first state after said first security data is programmed to said second state;

second electrically erasable means for storing second security data having first and second states;

second latching means responsive to said second security data for providing a second latching means output having first and second states, said latching means output having the same state as said second security data except during the edit mode when said second latching means output is latched to the same state of said second security data prior to the programmable logic device being in the edit mode;

second programming means responsive to second control signals and said first latching means output for electrically erasing said second electrically erasable means to initialize said second security data to said first state and for programming said second security data to said second state when said predetermined electrically erasable memory cells are selected in an edit mode subsequent to the edit mode in which said first security data was programmed to said second state, said programming means being disabled from resetting said second security data to said first state after said first security data is programmed to said second state; and

means for disabling erasure or programming of the predetermined electrically erasable memory cells in response to the second state of said second latching means output when the programmable logic device is in an edit mode subsequent to the edit mode in which said second security data was programmed to said second state.

4,887,240

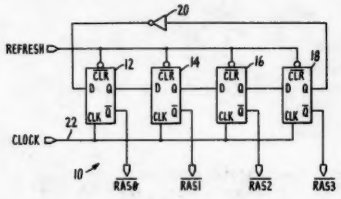
STAGGERED REFRESH FOR DRAM ARRAY

Timothy L. Garverick, Santa Clara; Farid A. Yazdy, San Francisco; Richard D. Henderson, Sunnyvale, and Webster B. Meier, Palo Alto, all of Calif., assignors to National Semiconductor Corporation, Santa Clara, Calif.

Filed Dec. 15, 1987, Ser. No. 132,997

Int. Cl.[4] G11C *13/00, 11/40*

U.S. Cl. 361—222 **7 Claims**



1. A refresh circuit for generating a plurality of refresh signals for a dynamic random access memory (DRAM) comprising memory cells subdivided into a plurality of memory cell banks such that the refresh signals are provided to the memory cell banks in one-to-one correspondence to refresh the memory cells comprising the respective memory cell bank, the refresh circuit comprising a plurality of edge-triggered flip-flops connected in series such that the data input signal to successive flip-flops in the series is provided by an output of the previous flip-flop in the series such that successive flip-flops generate a sequence of refresh signals in response to successive cycles of a clock signal commonly connected to each of the flip-flops, the refresh signals being connected to one-to-one correspondence to the memory cell banks and wherein an output of the last flip-flop in the series of flip-flops is provided via an inverter as the data input signal to the first flip-flop in the series to provide sequential termination of the refresh signals on a subsequent sequence of successive cycles of the clock signal.

4,887,241

ECL PROM PROGRAMMING METHOD AND APPARATUS USING ECL ADDRESSING MEANS

Dung Q. Tran, San Jose, Calif., assignor to Advanced Micro Devices, Inc., Sunnyvale, Calif.

Filed Jul. 31, 1986, Ser. No. 891,507

Int. Cl.[4] G11C *8/00, 7/00, 17/00, 11/36*

U.S. Cl. 365—230.06 **6 Claims**

1. An apparatus for reading and programming an ECL PROM having a plurality of addressable fuses comprising:

an ECL row address buffer having complementary first and second outputs;

a first row decoder gate coupled to said first output of said ECL row address buffer;

a second row decoder gate coupled to said second output of said ECL row address buffer;

a first current driving gate circuit coupled to said first row decoder gate;

a second current driving gate circuit coupled to said second row decoder gate;

a row program control circuit coupled to said first and said second current driving gate circuits for providing a row control signal when a selected one of said fuses is to be blown;

first means for coupling a first and a second one of said

plurality of fuses to said first row decoder and said first current driving gate;

second means for coupling a third and a fourth one of said plurality of fuses to said second row decoder gate and said second current driving gate;

an ECL column address buffer having complementary first and second outputs;

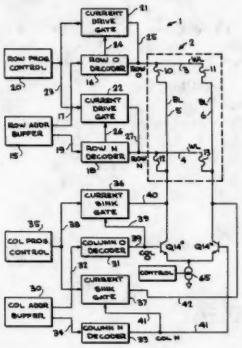
a first column decoder coupled to said first output of said ECL column address buffer;

a second column decoder coupled to said second output of said ECL column address buffer;

a first current sinking gate coupled to said first column decoder gate circuit;

a second circuit sinking gate coupled to said second column decoder gate;

a column program control circuit coupled to said first and said second current sinking gates for providing a column control signal when a selected one of said fuses is to be blown;



third means for coupling said first and said third one of said plurality of fuses to said first column decoder gate and said first current sinking gate;

fourth means for coupling said second and said fourth one of said plurality of fuses to said second column decoder and said second current sinking gate;

means located in said row and column decoders which is responsive to outputs from said row and column address buffers corresponding to a selected one of said fuses for providing first and second signals corresponding to said selected one of said fuses, respectively, when said selected one of said fuses is selected; and

means located in said current driving gates and said current sinking gates which is responsive to said first and said second signals, said row control signal and said column control signal for causing a current to flow through said selected fuse which has a magnitude sufficient to blow said fuse.

4,887,242

NON-VOLATILE SEMICONDUCTOR MEMORY DEVICE HAVING MEANS TO LATCH THE INPUT DATA BITS FOR CONTROLLING THE DRAIN AND GATE VOLTAGES OF MEMORY CELL TRANSISTORS

Kiyokazu Hashimoto, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

Filed Oct. 11, 1988, Ser. No. 255,697

Claims priority, application Japan, Oct. 9, 1988, 62-255828

Int. Cl.[4] G11C *7/00, 8/00*

U.S. Cl. 365—238.5 **11 Claims**

1. A non-volatile semiconductor memory device fabricated on a semiconductor substrate, said non-volatile semiconductor memory device being capable of performing a write-in operation having a loading phase, an automatically erasing phase and a write-in phase, comprising:

(a) a plurality of memory cell groups arranged in rows and columns, each memory cell group being provided with a plurality of memory cell transistors assigned respective bit locations and having respective gate electrodes;

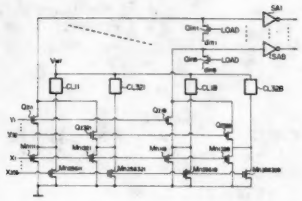
(b) a plurality of memory cell selecting transistors each coupled in series to each of said memory cell transistors and having a gate electrode;

(c) a plurality of row address selecting transistors each coupled to the gate electrodes of said memory cell transistors in each memory cell group and having a gate electrode;

(d) a plurality of byte column selecting transistors each provided in association with said memory cell groups in each column and capable of providing a conduction path between a source of control signal and said row address selecting transistors respectively provided in association with said memory cell groups in each column, each of said byte column selecting transistor having a gate electrode, said control signal being shifted to a third level in said automatically erasing phase but remaining in a second level in said loading phase and said write-in phase;

(e) a plurality of column address selecting transistor groups each provided in association with said memory cell groups in each column and having a plurality of column address selecting transistors respectively coupled to said memory cell selecting transistors having the respective bit locations identical with one another;

(f) a plurality of column latching circuit group each provided in association with said memory cell groups in each



column and having a plurality of latching circuits coupled to said memory cell selecting transistors having the respective bit locations identical with one another, said column latching circuits being coupled to a source of write-in voltage signal;

(g) a plurality of byte latching circuits each provided in association with each of said byte column selecting transistors and coupled between said row address selecting transistors respectively provided in association with said memory cell groups in each column and a source of erasing voltage signal;

(h) a source voltage controlling circuit responsive to a write-in signal and producing a source voltage supplied to source nodes of said memory cell transistors, said source voltage being shifted to a level near said second level in said write-in phase but remaining in a first level in said loading phase and said automatically erasing phase;

(i) a data input circuit operative to latch a plurality of input data bits each having said first or second level and producing a plurality of write-in controlling signals each having the first or second level on the basis of said input data bits;

(j) a plurality of data input transistors each coupled to said column address selecting transistors provided in association with memory cell selecting transistors respectively having the bit locations identical with one another, each of said data input transistors being responsive to a loading signal shifted to an active level in said loading phase to transfer each of write-in controlling signal to said column address selecting transistors, said loading signal being

shifted to an inactive level in said automatically erasing phase and said write-in phase;

(k) a plurality of row address lines each coupled to the gate electrodes of said memory cell selecting transistors and said row address selecting transistors which are respectively provided in association with said memory cell groups in each row, said row address lines propagating row address signals one of which is shifted to an active level in said automatically erasing phase and said write-in phase to allow said memory cell selecting transistors and said row address selecting transistors to turn on, said row address signals being shifted to an inactive level in said loading phase; and

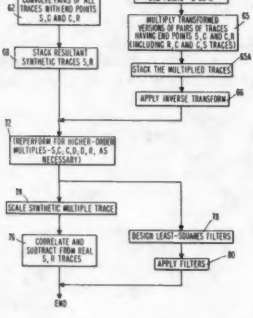
(l) a plurality of column address lines each coupled to the gate electrodes of said byte column selecting transistor and said column address selecting transistors provided in association with said memory cell groups in each column, said column address lines propagating column address signals, two or more that two of said column address signals being shifted in succession to said second level in said loading phase for allowing said control signal to be latched into said byte latching circuits and for allowing said column latching circuits to latch said write-in controlling signals, respectively, said column address signals remaining in said first level in said automatically erasing phase and said write-in phase, in which said write-in voltage signal and said erasing voltage signal are respectively shifted to the first level and third level in said automatically erasing phase and to the third level and the first level in said write-in phase, said control signal of said second level in each byte latching circuit of said second level being shifted to said third level in the presence of said erasing voltage signal of third level for automatically erasing functions, each write-in controlling signal of said second level being shifted to said third level in the presence of said write-in voltage signal of said third level for write-in function.

4,887,243

REMOVAL OF SURFACE MULTIPLES

Keh Pann, Richardson, Tex., assignor to Mobil Oil Corporation, New York, N.Y.

Filed Dec. 27, 1982, Ser. No. 452,996
Int. Cl.[4] G01V *1/38*
U.S. Cl. 367—24 **15 Claims**


SELECT TRACE FOR ANALYSIS HAVING END POINTS S, R
COMPUTE FOURIER TRANSFORM OF ALL TRACES HAVING END POINTS = S OR R
CONVOLVE PAIRS OF ALL TRACES WITH END POINTS S,C AND C, R
MULTIPLY TRANSFORMED VERSIONS OF PAIRS OF TRACES HAVING END POINTS S, C AND C, R (INCLUDING R, C AND C, S TRACES)
STACK RESULTANT SYNTHETIC TRACES S, R
STACK THE MULTIPLIED TRACES
APPLY INVERSE TRANSFORM
(REPERFORM FOR HIGHER-ORDER MULTIPLES - S,C, C,D, D, R, AS NECESSARY)
SCALE SYNTHETIC MULTIPLE TRACE
DESIGN LEAST-SQUARES FILTERS
CORRELATE AND SUBTRACT FROM REAL S, R TRACES
APPLY FILTERS
END

14. In seismic exploration wherein a plurality of seismic traces are generated by generating seismic energy at a plurality of points along an exploration line and detecting reflections of said seismic energy at a plurality of said points, a method of removing records of multiple reflection events from seismic traces representing waves of seismic energy travelling along paths having end points along said exploration line, comprising the steps of:

recording traces with respect to locations of sources and detectors of seismic energy along said line;

calculating Fourier-transformed versions of said traces;

selecting a trace to be analyzed;

selecting pairs of transformed versions of traces, the ones of said pairs of traces each having one end point in common and their other end points the same as the trace to be analyzed;

multiplying together corresponding frequency components of ones of said pairs;

stacking the results of said multiplying step to generate a synthetic multiple trace;

taking the inverse Fourier transform of the synthetic multiple trace; and

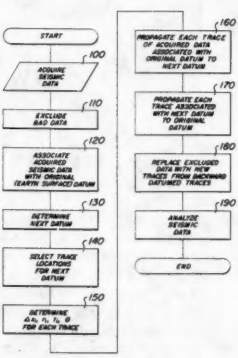
subtracting the inversely-transformed synthetic multiple trace from the trace to be analyzed.

4,887,244

METHOD FOR SEISMIC TRACE INTERPOLATION USING A FORWARD AND BACKWARD APPLICATION OF WAVE EQUATION DATUMING

Mark E. Willis, Carrollton; Rambabu P. Ranganayaki, Farmers Branch; Thomas E. Shirley, and Stan Y. C. Lee, both of Richardson, all of Tex., assignors to Mobil Oil Corporation, New York, N.Y.

Filed Jun. 28, 1988, Ser. No. 212,470
Int. Cl.[4] G01V *1/30*
U.S. Cl. 367—73 **24 Claims**



1. In seismic exploration wherein seismic sources are activated at spaced locations along a surface of exploration and the amplitude of reflections are recorded as a function of time along said surface to produce a first series of seismic traces, said series of seismic traces including at least one null trace, a method of interpolating seismic data for said at least one null trace comprising the steps of:

relating said first series of seismic traces to a first datum plane;

propagating said series of seismic traces related to said first datum plane to a fictitious second datum plane using forward wave equation datuming to create a second series of seismic traces;

propagating said second series of seismic traces back to said first datum plane using backward wave equation datuming to interpolate seismic data for said at least one null trace; and

producing a seismic section for said surface of exploration from said series of seismic traces and said produced seismic data.

4,887,245

COORDINATES INPUT APPARATUS

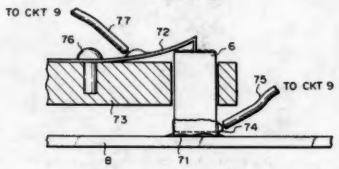
Shigeki Mori; Katsuyuki Kobayashi; Shinnosuke Tanishi, all of Tokyo, and Kousuke Yamamoto, Yokohama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Apr. 1, 1988, Ser. No. 177,423

Claims priority, application Japan, Apr. 6, 1987, 62-82897; Jul. 1, 1987, 62-162400; Jul. 21, 1987, 62-179991

Int. Cl.[4] G08C *21/00*

U.S. Cl. 367—129 7 Claims



1. A coordinates input apparatus comprising:

vibration generating means for generating a vibration;

a vibration propagating member for propagating the vibration generated by said vibration generating means by contacting said vibration generating means;

a plurality of vibration detecting means each for detecting the vibration propagated by said vibration propagating member and for generating a detection signal;

a spring member for urging each of said plurality of vibration detecting means into contact with said vibration propagating member through a fluid material with a predetermined viscosity; and

position coordinates detecting means for detecting position coordinates of said vibration generating means contacting said vibration propagating member on the basis of the detection signal generated by said vibration detecting means.

4,887,246

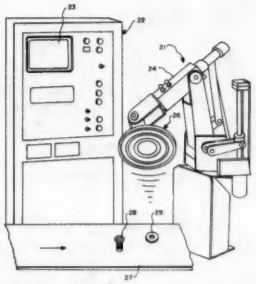
ULTRASONIC APPARATUS, SYSTEM AND METHOD

James M. Hossack, Seattle; Jeffry E. Powers, Bainbridge, and John K. Billings, Snohomish, all of Wash., assignors to Ultrasonic Arrays, Inc., Woodinville, Wash.

Filed Sep. 15, 1983, Ser. No. 532,576

Int. Cl.[4] H04R *23/00*

U.S. Cl. 367—140 21 Claims



1. In an ultrasonic apparatus for use in detecting an object, a capacitive type transducer, transmitter means for supplying pulses, receiver means, transmit receive switch means and means for causing operation of said transmit receive switch means to cause supplying of pulses from the transmitter means to said transducer to create transmitted ultrasonic energy and for receiving reflected ultrasonic energy received by the transducer, said transducer comprising a body having an opening therein, a rigid backing plate carried by the body and disposed in the opening, metallic means carried by the backing plate and providing a planar surface, a layer of flexible insulating material overlying the metallic means and a thin layer of conducting material disposed on the layer of flexible insulating material on the side facing away from the metallic means, the planar surface of the metallic means having sandpaper-like formed annular grooves disposed therein and facing towards the layer of flexible insulating material.

4,887,247

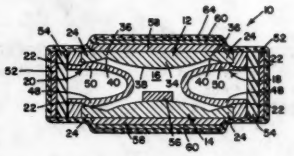
COMPLIANT TUBE BAFFLE

Robert H. Black, Jacksonville, Fla., and Samuel J. Caprette, Jr., Chagrin Falls, Ohio, assignors to The B. F. Goodrich Company, Akron, Ohio

Continuation-in-part of Ser. No. 157,008, Feb. 18, 1988, abandoned. This application Jun. 28, 1988, Ser. No. 214,917

Int. Cl.[4] H04R *17/00*

U.S. Cl. 367—151 16 Claims



1. A boxlike structure for use in a sonic reflector, configured for submersion into a marine environment comprising a pair of generally rectangular tapered elastic beam elements positioned in generally parallel planes and spaced-apart spring means positioned between said beam elements and in engagement with side edges of said beam elements to resiliently separate said beam elements, each of said beam elements having a length measured between ends of said beam elements substantially in excess of a width measured between sides of said beam elements, each of said beam elements having a thickness at a center portion greater than a thickness at side portions with tapered sections between said center portion and said side portions to provide maximum dynamic displacement with minimum unit stress and an elastomeric encapsulant surrounding and encapsulating the boxlike structure and formed of an elastomer for preventing water penetration.

4,887,248

ELECTROSTATIC TRANSDUCER AND METHOD OF MAKING AND USING SAME

Elmer L. Griebeler, Streetsboro, Ohio, assignor to Cleveland Machine Controls, Inc., Cleveland, Ohio

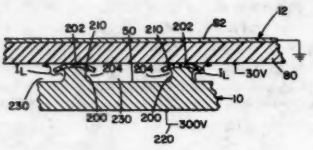
Continuation of Ser. No. 218,477, Jul. 7, 1988, abandoned, which is a continuation of Ser. No. 904,695, Sep. 8, 1986, abandoned. This application Mar. 3, 1989, Ser. No. 319,913

Int. Cl.[4] H04R *19/00*

U.S. Cl. 367—181 30 Claims

1. In a capacitance type, electrostatic air pressure wave transducer, said transducer including: a relatively inflexible backplate with at least one major surface thereof formed of electrically conductive material, a relatively flexible membrane including a layer of electrically conductive material stretched across and coextensive with said one major surface; and means formed in said conductive material for maintaining a capacitor forming spacing between said major surface and said stretched membrane, the improvement comprising: said

means for maintaining said spacing is a multitude of discrete metal pedestals distributed on said major surface with a gener-



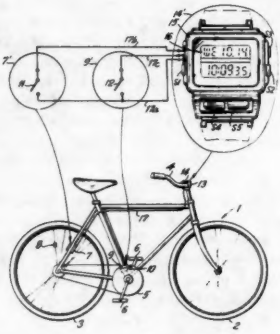
ally flat top surface covered by an individual thinner piece of electrically insulating material.

4,887,249

BICYCLE WATCH - DUAL MODE CIRCUIT

Tom Thinesen, Sunnyvale, Calif., assignor to Timex Corporation, Waterbury, Conn.

Filed Apr. 19, 1988, Ser. No. 183,120
Int. Cl.[4] G04B *47/00*; G01D *3/42*
U.S. Cl. 368—10 **16 Claims**



1. An improved bicycle watch with dual mode circuit, comprising;

a case having a plurality of manual actuators, an electrooptical display and a microcomputer in said case connected to said electrooptical display and responsive to said manual actuators,

means supplying periodic external signals to said microcomputer in response to operation of a bicycle,

said microcomputer being programmed to provide a watch mode having a first plurality of states and adapted to generate timekeeping signals and to display at least one timekeeping signal in one of said first states, and a bike mode having a second plurality of states and adapted to perform computations on said external signals and to display at least one operative condition of the bicycle in one of said second states, and

said circuit being programmed to switch between watch mode and bike mode in response to actuation of at least a first manual actuator in a predetermined manner.

4,887,250

APPARATUS FOR REPRODUCING THE APPEARANCE OF HEAVENLY BODIES

Bernard Vuarnesson, 1 Blvd. St. Michel, 75006 Paris, France

Filed Apr. 22, 1988, Ser. No. 185,065
Claims priority, application France, May 12, 1987, 87 0669
Int. Cl.[4] G04B *19/26*
U.S. Cl. 368—15 **7 Claims**

1. An apparatus for reproducing the appearance of the phases of the moon, comprising:

a cover having a opaque wall defining an opening having substantially the form of a circle,

a part representative of the moon, the part having substantially the form of a disc or sphere and so sized as to be capable of substantially filling the opening in the cover,

means for supporting the part in a non-rotatable manner, and

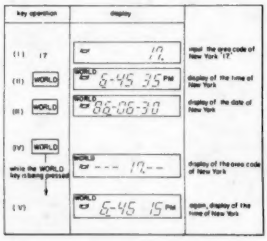
means for supporting the cover for rotation with respect to the part about an axis which passes through the center of the opening in the cover and along a diameter of the part, whereby rotating the cover, while viewing the part in a direction perpendicular to the axis, causes the portion of the part unobscured by the cover to represent the phases of the moon.

4,887,251

WORLD TIMEPIECE

Hiroshi Takada, Nara, Japan, assignor to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Mar. 18, 1988, Ser. No. 170,240
Claims priority, application Japan, Mar. 20, 1987, 62-40988
Int. Cl.[4] G04B *19/22*
U.S. Cl. 368—21 **6 Claims**



1. A world timepiece for generating time and date information in each of a plurality of world time zones, comprising:

input means for inputting at least area code information corresponding to one of said plurality of world time zones;

code memory means for storing said input area code information;

means for maintaining a current time and date for each of said plurality of world time zones including means for continuously sequentially counting the time and date information for each of said plurality of world time zones;

means for temporarily storing said current time and date

information corresponding to the input area code information for one of said plurality of world time zones; and

display means, responsive to said means for accessing, for successively displaying the current time, the current date, and the area code corresponding to the input area code, wherein a first actuation of said means for accessing displays said current time information, a second actuation of said means for accessing displays said current date information, and a third actuation of said means for accessing within a predetermined time period displays the input area code so long as said means for accessing remains actuated, said current time information again being displayed upon release of said means for accessing.

4,887,252

SOLID-STATE COLOR TELEVISION CAMERA WITH COLOR AND LUMINANCE SIGNAL CORRECTION

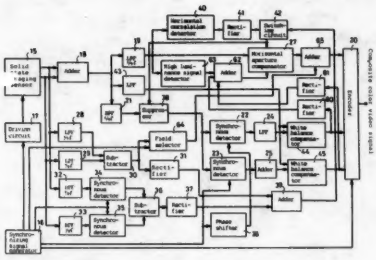
Yasumi Miyakawa, Hirakata, and Tatsuki Ide, Neyagawa, both of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan

Continuation of Ser. No. 560,816, Dec. 13, 1985, abandoned. This application Feb. 17, 1987, Ser. No. 15,509

Claims priority, application Japan, Dec. 14, 1982, 57-219405; Dec. 14, 1982, 57-219406; Aug. 19, 1983, 58-152032; Oct. 6, 1983, 58-187898; Oct. 7, 1983, 58-189073; Oct. 7, 1983, 58-189074; Oct. 7, 1983, 58-189092

Int. Cl.[4] H04N *9/07, 5/208, 5/21, 9/64*

U.S. Cl. 358—48 **19 Claims**



1. A solid state color imaging apparatus comprising:

a solid state imaging sensor comprising a plurality of photoelectric elements regularly disposed in a two-dimensional pattern comprising a plurality of horizontal lines extending in a horizontal direction, each horizontal line having a plurality of photoelectric elements in repetition at a predetermined horizontal pitch;

a color filter disposed substantially in front of said solid state imaging sensor and comprising a plurality of color filter elements having three spectral distributions disposed in a predetermined order of repetition in said horizontal direction;

said solid state imaging sensor having a structure such that each photoelectric element is connected to one of a plurality of vertically disposed signal lines, wherein all of the photoelectric elements connected to any given one of said vertically disposed signal lines receive light through color filter elements having the same spectral distribution, and such that plural signals corresponding to a predetermined number of vertically neighboring horizontal lines of photoelectric elements can be simultaneously read out;

circuit means for producing at least one of: (a) first plural luminance signals, (b) first plural chrominance signals, (c) a second luminance signal, and (d) at least one second chrominance signal from said simultaneously read-out signals;

correlation detection circuit means for detecting the amount of vertical correlation between at least one of (a) said first plural luminance signals and (b) said first plural chrominance signals; and

suppressing circuit means for altering a characteristic of at least one of (a) said second luminance signal and (b) said at least one second chrominance signal, based on said amount of vertical correlation detected by said correlation detection circuit means.

4,887,253

SCANNING METHOD AND APPARATUS FOR PERFORMING TRACK JUMP OPERATIONS IN DISK PLAYER

Kiyoshi Tateishi, Saitama, Japan, assignor to Pioneer Electronic Corporation, Tokyo, Japan

Filed Jun. 22, 1988, Ser. No. 209,728

Claims priority, application Japan, Sep. 1, 1987, 62-218400

Int. Cl.[4] G11B *7/00*

U.S. Cl. 369—32 **10 Claims**

1. In a disk player comprising a slider for carrying a pickup movably in the radial direction of a recorded disk, said pickup having a tracking actuator for adjusting a relative position of an information detecting point in a direction substantially perpendicular to a recorded track on said recorded disk, tracking error signal generating means for generating a tracking error signal corresponding to an amount of deviation of said information detecting point from said recorded track, a tracking servo loop for driving said tracking actuator so as to make said tracking error signal a minimum, and signal processing means for reproducing a readout signal obtained from said pickup when said tracking servo loop is closed, a scanning method comprising the steps of: opening said tracking servo loop in response to a scanning command; driving said tracking actuator to perform a jump operation until a number of tracks detected by a track counter for detecting a number of tracks jumped by said information detecting point reaches a designated value; and, if said scanning command continues at a point of time after a lapse of predetermined period from completion of said jump operation, performing said jump operation again.

4,887,254

OPTICAL DISK DRIVE DEVICE FOR POSITIONING A CARRIAGE TO A RETRACT POSITION

Keiji Nakatsu; Katsuaki Kamitsu, and Masaharu Ogawa, all of Hyogo, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 24, 1988, Ser. No. 172,525

Claims priority, application Japan, Jun. 12, 1987, 62-145163

Int. Cl.[4] G11B *7/00, 21/08*

U.S. Cl. 369—33 **19 Claims**

1. An optical disk drive device for positioning a carriage (3) having mounted thereon an optical head (2) for emitting a light beam onto an optical disk and for receiving the light beam after it is reflected by the optical disk (1), the optical disk having a plurality of tracks for storing information, the optical disk drive device comprising:

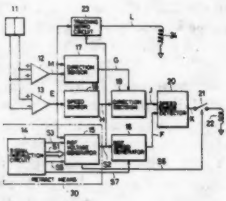
an actuator (4) for moving the carriage in a radial direction relative to the optical disk so as to traverse the tracks;

a speed sensor (18) for sensing a moving speed of the carriage according to the received reflected light by the optical head when the carriage is moved by said actuator;

a signal instruction circuit (14) for outputting a track traverse signal (S1) representing a number of tracks to be traversed by said actuator, an access start instruction signal (S3) for initiating a carriage access operation, and a retract instruction signal (S5) for initiating a carriage retract operation;

a reference voltage generator (15), connected to receive the track traverse signal, the access start instruction signal and the retract instruction signal, for outputting a residual track number signal (S2) representing the number of tracks remaining to be traversed by the carriage;

a reference speed generating circuit (16), connected to receive the residual track number signal from said reference voltage generator, for outputting a reference speed signal (F) according to the residual track number signal; and



a speed error detection signal (20) for comparing the sensed carriage moving speed with the outputted reference speed signal, and for outputting a speed error signal (K) according to the comparison;

said reference voltage generator generating a first carriage moving signal, in response to the access start instruction signal, for allowing the carriage to be moved from a present track position on the optical disk to a first predetermined position in accordance with the outputted speed error signal, said reference voltage generator generating a second carriage moving signal in response to the outputted retract instruction signal for allowing the carriage to move from the first predetermined position to a second predetermined position in accordance with the speed error signal,

the speed error signal being constant when the carriage is moved from the first to the second predetermined position.

4,887,255

INTEGRATED OPTICAL HEAD

Yuichi Handa; Masahiro Okuda, and Hiroshi Osawa, all of Atsugi, Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Aug. 20, 1987, Ser. No. 87,516

Claims priority, application Japan, Aug. 25, 1986, 61-197382

Int. Cl.[4] G11B *7/135*; G02B *6/12*

U.S. Cl. 369—112 **9 Claims**

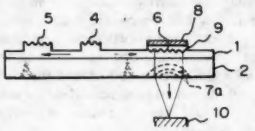
1. An integrated optical head comprising:

a substrate;

an optical waveguide formed on a surface of one side of said substrate;

directing means for directing a light to said optical waveguide;

a grating structure for deflecting a light propagating in said optical waveguide toward said substrate; and



a distributed refractive index lens formed in said substrate for condensing the light passing through said substrate after the deflection toward an article.

4,887,256

DATA COMMUNICATION NETWORK SYSTEM AND RECONFIGURATION CONTROL METHOD

Susumu Nakayashiki, Sagamihara; Jiro Kashio, Kawasaki, and Takeshi Harakawa, Hadano, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

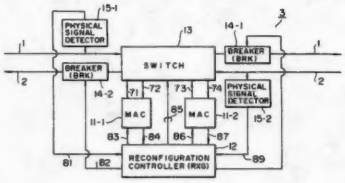
Division of Ser. No. 171,698, Mar. 22, 1988, Pat. No. 4,815,069.

This application Dec. 28, 1988, Ser. No. 291,308

Claims priority, application Japan, Jul. 10, 1987, 62-170953

Int. Cl.[4] H04J *3/14*

U.S. Cl. 370—16 **3 Claims**



1. A method for controlling a plurality of stations in a communication system which comprises first and second ring transmission lines for connecting said stations and for providing opposite signal transmission directions, each of said stations having layered communication architecture including a physical layer level communication function and a medium access control layer level communication function, the method comprising the steps of:

operating the medium access control layer level communication function of a first one of said stations which is located immediately downstream with respect to a failure position in said first transmission line to send a notice signal to said first transmission line in response to detection of a physical failure in said first transmission line by the physical layer level communication function of said first station;

forming a first loop-back path from said first transmission line to said second transmission line by a second one of said stations which is located immediately upstream with respect to said failure position in said first transmission line to send back said notice signal received from said first transmission line to said second transmission line; and

forming a second loop-back path from said second transmission line to said first transmission line by said first station when the medium access control layer level communication function detects that the notice signal returns back via said first loop-back path.

4,887,257
ECHO CANCELLING DEVICE FOR DATA TRANSMISSION OVER TWO-WIRE LINES

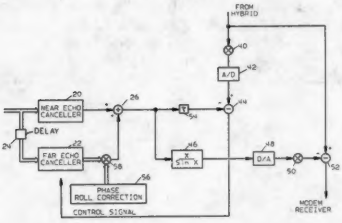
Jacques Belloc, Antibes; Emile Morlec, St. Paul; Dominique Godard, LeRouret, and Michel Quintin, LaGaude, all of France, assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Mar. 7, 1988, Ser. No. 164,754

Claims priority, application European Pat. Off., Apr. 22, 1987, 87430012.2

Int. Cl.[4] H04B *3/23*

U.S. Cl. 370—32.1 **9 Claims**



1. In a data transmission system connected to a two-wire line portion (**18**) of a transmission medium over which the transmission of an outgoing signal in analog form which has been converted from an outgoing signal in digital form can be made simultaneously with the reception of an incoming signal in analog form, wherein said incoming signal in analog form is composed of a signal received from a remote system and an echo signal, produced by said transmission medium in response to said outgoing signal in analog form, an echo cancelling device for providing a generated echo signal for said incoming signal in analog form and subtracting said generated echo signal from said incoming signal in analog form, said echo cancelling device being characterized in that it comprises:

echo signal generating means (**20, 22, 26**) for providing an estimated echo signal in digital form from the outgoing signal in digital form;

a first circuit path including a digital-to-analog converter (**48**) for converting said digital estimated echo signal to analog form, and analog subtracting means (**52**) for subtracting said analog estimated echo signal from said incoming signal in analog form, thereby providing an echo-free signal in analog form, and

a second circuit path including an analog-to-digital converter (**42**) for converting said incoming signal in analog form to digital form, and digital subtracting means (**44**) for subtracting said digital estimated echo signal from said incoming signal in digital form, thereby providing a digital signal which is used as a control signal for said echo signal generating means.

4,887,258
ECHO CANCELLING DEVICE WITH PHASE-ROLL CORRECTION

Jacques Belloc, Antibes; Dominique Godard, LeRouret; Emile Morlec, St. Paul, and Michel Quintin, LaGaude, all of France, assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Mar. 4, 1988, Ser. No. 164,305

Claims priority, application European Pat. Off., Apr. 22, 1987, 87430015.5

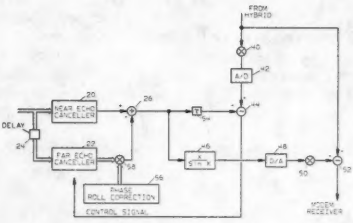
Int. Cl.[4] H04B *3/23*

U.S. Cl. 370—32.1 **5 Claims**

1. In a data transmission system connected to a two-wire line portion of a transmission medium over which the transmission of an outgoing signal in analog form which has been converted from an outgoing signal in digital form can be made simultaneously with the reception of an incoming signal in analog form, said system operating in half-duplex mode wherein the incoming signal in analog form is an echo signal produced by said transmission medium in response to the outgoing signal in analog form, an echo cancelling device for generating an estimated echo signal, providing a phase-roll corrected echo signal and subtracting the real component of said phase-roll corrected echo signal from said incoming signal in analog form to form an error signal, said echo cancelling device being characterized in that it includes a phase-roll tracking device comprised of:

phase rotating means (**58**) for rotating the phase of the estimated echo signal by a value X which is the estimated phase-roll value, thereby providing a complex signal representative of said phase-roll corrected echo signal;

multiplying means (**124**) for multiplying said error signal by the imaginary component (**120**) of said phase-roll corrected echo signal, thereby providing a value Y which is representative of the variation of the phase-roll;



a phase variation estimator (**128**) providing an estimation of the phase-roll variation Z in response to said value Y,

said phase variation estimator (**128**) operating in half duplex mode and including:

a gain device (**140**) which provides a value proportional to said value Y, which is taken as said estimation of the phase-roll variation Z when both said phase-roll corrected echo signal and said error signal are relatively large; and

a multiplier (**146**) for providing the product of the sign bit (**142**) of the phase-roll corrected echo signal and the sign bit (**144**) of the error signal, said product being taken as said estimation of the phase-roll variation Z when said phase-roll corrected echo signal and/or said error signal are small; and a phase filter (**126**) providing said estimated phase-roll value X in response to said estimation of the phase-roll variation Z.

4,887,259
COMMUNICATION NETWORK HAVING MULTI-CONJUNCTION ARCHITECTURE

Tetsuya Morita, Yokohama, Japan, assignor to Ricoh Company, Ltd., Tokyo, Japan

Filed Sep. 7, 1988, Ser. No. 241,414

Claims priority, application Japan, Sep. 8, 1987, 62-222980

Int. Cl.[4] H04Q *11/04*

U.S. Cl. 370—60 **16 Claims**

1. A communication network structure comprising:

a plurality of communication networks, each of said communication networks having a multi-conjunction architecture and including a plurality of node apparatuses, a plurality of first transmission paths for coupling the node apparatuses, and a plurality of terminal hosts connected to at least an arbitrary one of the node apparatuses, a maximum propagation delay time of the first transmission path being less than a predetermined value;

one or a plurality of router hosts connected to each of said communication networks; and

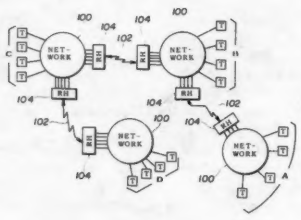
a second transmission path for coupling two said communication networks through a pair of said router hosts respec-

tively located on ends of said second transmission path, a maximum propagation delay time of said second transmission path being greater than or equal to said predetermined value,

said router host having first means for multiplexing signals to and separating signals from said second transmission path, second means coupled to said first means for storing identification information including host numbers of at least the terminal hosts which are directly connected to a said communication network which is coupled to said router host through a said second transmission path, third means coupled to said first and second means for controlling operations of said router host, input and output channels connected to one of the node apparatuses of a said communication network and to said third means, and input and output ports connected to said third means and said second transmission path,

said third means detecting a first receiving input channel which receives a first sending signal first out of unused light channels connected to said one of the node apparatuses of a said communication network and closing an output channel having a channel number corresponding to that of the first receiving input channel and all of the unused input channels except the first receiving input channel when the first receiving input channel is detected to immediately output an active signal to the output channel having the channel number corresponding to that of the first receiving input channel,

said third means collating a destination host number included in the first sending signal and the host numbers stored in said second means and outputting a temporary first returning signal to the output channel having the channel number corresponding to that of the first receiving input channel when the destination host number exists in the host numbers stored in said second means, so as to fix a temporary path between a source host which originates the first sending signal and said router host;



said third means outputting to a control output port of the output ports a caller information including a port designation information and the first sending signal when the destination host number exists in the host numbers stored in said second means, said port designation information being an identification information of a port of said first means corresponding to the first receiving input channel,

said third means detecting a receipt of a connection completion information including the port designation information and a first returning signal at a control input port of the input ports and connecting the designated output port to the output channel having the channel number corresponding to that of the first receiving input channel so as to output the first returning signal from the output channel having the channel number corresponding to that of the first receiving input channel and connecting the first receiving input channel to one of the output ports corresponding to the first receiving input channel when the destination host number exists in the host numbers stored in said second means,

said third means opening the closed channel other than the designated channels after the first receiving input channel and the output channel having the channel number corresponding to that of the first receiving input channel are connected to the corresponding input and output ports,

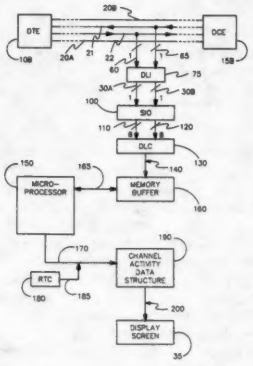
said third means supervising a channel with a fixed path and releasing the channel as an unused channel when a signal received at the channel continues a predetermined state for a communication end detection time constant.

4,887,260

X.25 WIDE AREA NETWORK CHANNEL STATUS DISPLAY

Matthew J. Carden; Kim Lantz, both of Colorado Springs; Theresa L. Reh, Monument; Anne Trytten, Colorado Springs, all of Colo., and Yves Lubino, Albertville, France, assignors to Hewlett-Packard Company, Palo Alto, Calif.

Filed Feb. 17, 1987, Ser. No. 14,966
Int. Cl.[4] H04Q *11/04*
U.S. Cl. 370—60 **4 Claims**



1. A dynamic communication channel status display system for monitoring channel activity on an X.25 wide area network DTE-DCE interface link, said display system showing the status of all possible logical channels at the interface link, said display system to be used with a protocol analyzer or a similar instrument, said display system comprising:

a first display means for displaying a dynamic Channel Activity Display, said Channel Activity Display showing an n-by-m matrix arrangement of status characters wherein each status character is represetative of pre-determined logical channel status;

said Channel-Activity Display also having a status key indicating the meaning of each status character;

cursor display means for displaying a cursor in said Display;

cursor movement means for enabling a user of said display system to move said cursor to pre-determined positions within said Channel Activity Display;

logical channel status identification means for identifying the status of at least one logical channel;

association means for associating a pre-determined status character with a corresponding pre-determined logical channel status;

logical channel group number (LCGN) numerical identification display means for numerically identifying and/or displaying an LCGN on said Channel Activity Display;

logical channel identifier (LCI) numerical identification display means for numerically identifying and/or displaying an LCI number on said Channel Activity Display;

said Channel Activity Display being user-configurable such that said n-by-m matrix shows the status of each logical channel in at least one LCGN of logical channels;

said Channel Activity Display being further user-configurable to display an LCI number corresponding to the posi-

tion of said cursor within said Channel Activity Display; and

a second display means for displaying a dynamic Call Record Display, available as a display option to the viewer of said Channel Activity Display, said display system further comprising:

organized-listing-call-information means for collecting, organizing and displaying an organized listing of call-information concerning a call on the logical channel corresponding to the position of the cursor in said Channel Activity Display, wherein said call-information includes an indication of at least one of the following:

said logical channel's LCI number;

a point in time at which said call on said logical channel was initiated;

duration in time of said call;

X.25 network addresses of the calling DTE and the called DTE of said call;

number of X.25 level-3 packets exchanged in said call.

4,887,261

METHOD AND ARRANGEMENT FOR TRANSMITTING A DIGITAL SIGNAL WITH A LOW BIT RATE IN A TIME SECTION, PROVIDED FOR HIGHER BIT RATES, OF A TIME DIVISION MULTIPLEXED SIGNAL

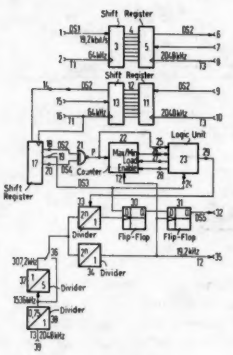
Claus Roempp, Munich, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Dec. 3, 1987, Ser. No. 128,158

Claims priority, application Fed. Rep. of Germany, Dec. 19, 1986, 3643561

Int. Cl.[4] H04J *3/22*

U.S. Cl. 370—84 **11 Claims**



1. A method of transmitting a first digital signal in a time section of a pulse frame of a time division multiplexed signal for which a higher bit rate than that of the first digital signal is made available for transmission in this time section, comprising the steps of:

at a transmitting end over-sampling the first digital signal with a first clock signal assigned to this time section,

transmitting a second digital signal, obtained as a result of the over-sampling, in the time deviation multiplexed signal and,

sampling at a receiving end, following demultiplexing, the second digital signal with a second clock signal, corresponding to its bit rate, omitting forbidden phase position zones which would otherwise lead to double samplings.

4,887,262

SINGLE-CHANNEL BUS SYSTEM FOR MULTI-MASTER USE WITH BIT CELL SYNCHRONIZATION, AND MASTER STATION COMPRISING A BIT CELL SYNCHRONIZATION ELEMENT SUITABLE FOR THIS PURPOSE

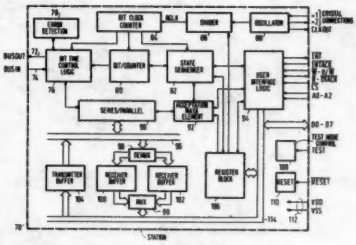
Evert D. van Veldhuizen, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Mar. 15, 1988, Ser. No. 168,191

Claims priority, application Netherlands, Mar. 30, 1987, 8700736

Int. Cl.[4] H04J *3/02*

U.S. Cl. 370—85.1 **7 Claims**



1. A single-channel bus system for multi-master use for a plurality of mutually asynchronously controlled master stations using messages comprising an arbitration field of a uniform number of bit cells of fixed nominal length, followed by a data field, the system comprising:

(a) a bus having a dominant state and a non-dominant state, and

(b) for each respective master station:

a storage element for storing an intended delay time between a local signal transition generated by the respective master station and a resultant detectable signal transition, which resultant detectable signal transition results from the local signal transition and is detectable on the bus;

sequencer means, having a cycle duration which corresponds to said nominal length, for starting an arbitration field bit cell when the sequencer means reaches a given state within a cycle;

a first adjusting element (**148**) for presetting said sequencer means with the contents of the storage element under control of a state transition, on the bus, to the dominant bus state;

wherein

(c) at least one master station comprises

a second adjusting element (**140**) for loading a current state of said sequencer means into said storage element during the data field of a message to be transmitted by the respective master station, under control of a further state transition, on the bus, to the dominant bus state.

4,887,263

VEHICLE MULTIPLEX SYSTEM WITH MULTIFUNCTION SWITCHES

Lee W. Steely, Reinholds, Pa., assignor to AMP Incorporated, Harrisburg, Pa.

Filed Dec. 8, 1987, Ser. No. 130,349

Int. Cl.[4] H04J *3/00*

U.S. Cl. 370—85.1 **13 Claims**

3. In an automotive vehicle of the type comprising at least one manually operated control switch and at least one controlled element, a multiplex system comprising:

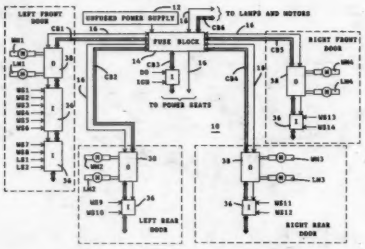
a programmable central controller;

at least one control bus coupled to the controller;

means for applying a multiplexed switch signal to the at least one control bus indicative of the state of the switch;

means for applying a multiplexed status signal to the at least one control bus, said multiplexed status signal having at least two states indicative of whether an operator has placed the vehicle in a first or second state;

first means, included in the controller, for generating a multiplexed control signal on the at least one control bus in accordance with the switch signal when the status signal indicates that the vehicle has been placed in the first state;



second means, included in the controller, for preventing the switch signal from altering the state of the multiplexed control signal when the status signal indicates that the vehicle has been placed in the second state;

means, coupled to the at least one control bus, for demultiplexing the multiplexed control signal to form a demultiplexed control signal; and

means for controlling activation of the element in response to the demultiplexed control signal.

4,887,264

DIGITAL KEY TELEPHONE SYSTEM

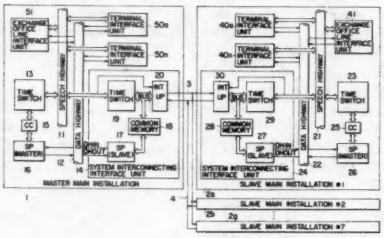
Hiroshi Mano; Masayuki Tsurusaki; Yoshikazu Sano, and Junichi Shiomi, all of Hino, Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Aug. 10, 1988, Ser. No. 230,799

Claims priority, application Japan, Sep. 4, 1987, 62-221274; Sep. 4, 1987, 62-221275

Int. Cl.[4] H04Q *11/04*

U.S. Cl. 370—58.2 **10 Claims**



1. A digital key telephone system having a master main installation and at least two slave main installations, said master main installation comprising:

(a) first speech data exchange means for exchanging digital speech data in first time division channels;

(b) first data transmit/receive means, connected to first terminal devices of said master main installation, for transmitting and receiving digital speech data to and from said first time division channels based on communication with said first terminal devices;

(c) first control means for generating digital control data to control said first speech data exchange means, said first data transmit/receive means and said slave main installations; and

(d) first digital interface means for transmitting digital control data from said first control means and digital speech data from said first time division channels to said slave main installations whose addresses are designated by said master main installation; and

each of said slave main installations comprising,

(a) second speech data exchange means for exchanging digital speech data in second time division channels;

(b) second data transmit/receive means, connected to second terminal devices of said slave main installation, for transmitting and receiving digital speech data to and from said second time division channels based on communication with said second terminal devices;

(c) second control means for generating digital control data to control said second speech data exchange means and said second data transmit/receive means; and

(d) second digital interface means for receiving digital control data and digital speech data transmitted from said master main installation only when an address of said slave main installation is designated by said master main installation, and for transmitting received digital control data and received digital speech data to said second control means and to said second time division channels, respectively.

4,887,265

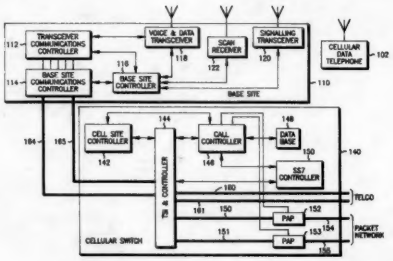
PACKET-SWITCHED CELLULAR TELEPHONE SYSTEM

Kenneth A. Felix, Crystal Lake, Ill., assignor to Motorola, Inc., Schaumburg, Ill.

Filed Mar. 18, 1988, Ser. No. 170,960

Int. Cl.[4] H04J *3/24*

U.S. Cl. 370—94.1 **16 Claims**



1. A cellular telephone system for switching telephone calls between cellular telephones and a landline network and switching data between the cellular telephones and a data network, each one of the cellular telephones generating a voice radio channel request to request voice service and generating a data radio channel request to request data service, comprising:

a plurality of base sites each including: transceiver means having at least one signaling radio channel for receiving the voice radio channel requests and the data radio channel requests from the cellular telephones, and having voice radio channels and shared data radio channels for communications with the cellular telephones, each of the shared data radio channels capable of being shared by at least two of the cellular telephones; and control means responsive to each received voice radio channel request for assigning a requesting one of the cellular telephones to one of the radio channels and responsive to each received data channel request for assigning a requesting one of the cellular telephones to one of the shared data radio channels; and

switching means coupled to each of the plurality of base sites

for coupling the voice radio channels to the landline network and the shared data radio channels to the data network.

4,887,266

COMMUNICATION SYSTEM

Brian D. Neve, Exbury; Peter J. Lawrence, Fareham, and Lyndon N. Owen, Blackfield, all of England, assignors to Process Automation & Computer Systems Ltd., London, England

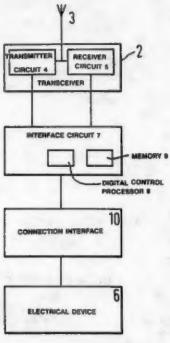
PCT No. PCT/GB86/00230, § 371 Date Dec. 29, 1986, § 102(e) Date Dec. 29, 1986, PCT Pub. No. WO86/06571, PCT Pub. Date Nov. 6, 1986

PCT Filed Apr. 29, 1986, Ser. No. 2,763

Claims priority, application United Kingdom, Apr. 29, 1985, 8510808

Int. Cl.[4] H04J *3/16*

U.S. Cl. 370—95.1 **12 Claims**



1. A communication system operating on a single channel including a device at each of a plurality of nodes between which it is desired to establish communication, one device including means for transmitting synchronization information to each other device simultaneously and each other device having means for providing a synchronization signal in synchrony with said synchronization information, said one device being capable of transmitting to each other device simultaneously an address of another device in one of a cyclically repeating series of consecutive time slots, said one time slot being preassigned for transmission of said address and said other device being arranged to communicate upon receipt and recognition of its address, and at least one other of said time slots in each cycle being reserved so that no such said address may be transmitted therein, whereby any of said other devices may transmit in such a reserved time slot to request communication on said channel, the remaining time slots of said series being usable for the transmission of address information and data.

4,887,267

LOGIC INTEGRATED CIRCUIT CAPABLE OF SIMPLIFYING A TEST

Akira Kanuma, Yokohama, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Dec. 28, 1987, Ser. No. 138,804

Claims priority, application Japan, May 22, 1987, 62-125599

Int. Cl.[4] G06F *11/00*

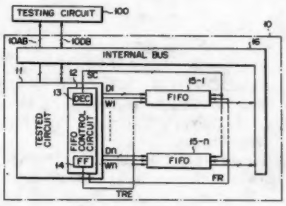
U.S. Cl. 371—22.3 **12 Claims**

1. A logic integrated circuit comprising:

a tested circuit to be inspected;

a plurality of memory means of a FIFO memory type each of which have input terminals connected to respective test nodes of said tested circuit, for storing logical values from corresponding, respective test nodes, in response to commands executed by said tested circuit; and

control means for controlling storage of the logical values in each of said plurality of memory means and read-out of the stored logical values from each of said plurality of memory means, said control means including decoder means, connected to said plurality of memory means, for selecting one of said plurality of memory means to read-out stored logical values from said one of said plurality of



memory means and flip-flop means, connected to said plurality of memory means, for specifying a period during which corresponding logical values are stored in said respective memory means, and said control means successively storing the logical values at corresponding test nodes of said tested circuit in said memory means each time a write-in condition is satisfied during a period specified by said flip-flop means and for reading out data, after the end of write-in, from said memory means selected by said decoder means.

4,887,268

ERROR CHECKING APPARATUS

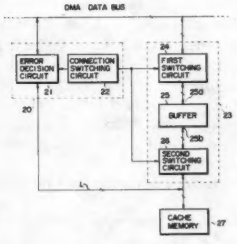
Hisanori Tohara, Ootawara, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Dec. 24, 1987, Ser. No. 137,597

Claims priority, application Japan, Dec. 27, 1986, 61-309058

Int. Cl.[4] G06F *11/10*

U.S. Cl. 371—40.1 **9 Claims**



1. An error checking apparatus comprising:

interface means for interfacing data having a plurality of bits;

first switching means, including a plurality of first terminals connected to a plurality of transmission lines for transmitting data, and a plurality of second terminals respectively corresponding to said plurality of first terminals, for switching mutual connections between said first and second terminals;

second switching means, including a plurality of first terminals respectively connected to said second terminals of said first switching means through said interface means, and a plurality of second terminals corresponding to said first terminals thereof, for switching mutual connections between said first and second terminals thereof; and

means for detecting data obtained from said first and second switching means before and after said first and second switching means are switched to determine an error position and a cause of an error in accordance with the data.

4,887,269

APPARATUS FOR THE RECEPTION OF RADIO BROADCASTED DIGITAL SIGNALS

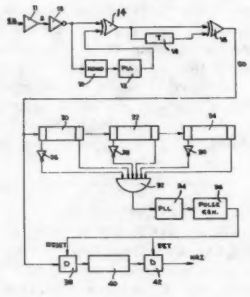
Mario Cominetti, San Mauro Torinese, and Alberto Morello, Turin, both of Italy, assignors to RAI Radiotelevisione Italiana, Torino, Italy

Filed Dec. 2, 1987, Ser. No. 127,411

Claims priority, application Italy, Dec. 19, 1986, 22762 A/86

Int. Cl.[4] G06F *11/10*

U.S. Cl. 371—47 **5 Claims**



1. Apparatus for receiving radio broadcasted digital signals produced by grouping a desired sequence of characters into a series of digital blocks, each block of said series starting with a synchronization character and a prefix which includes a sequence identifier, the overall number of blocks forming said series, and the number of said block in said series, wherein each character of said sequence is serially encoded to have a start bit, a stop bit and eight data bits therebetween, said series of blocks being further converted into a differential two-phase signal which is broadcast by modulation onto a carrier frequency, said apparatus for receiving said broadcasted signals comprising:

(a) a receiver for demodulating said differential two-phase signal;

(b) a digital computer having a serial input for processing said series of blocks; and

(c) an interface between said receiver and said serial input of said digital computer, said interface further including a bit clock signal generator adapted to detect the mid-bit transitions of the differential two-phase signal to provide a clock signal synchronized with the frequency of said differential two-phase signal, a two-phase decoder having an EXOR gate driven by said differential two-phase signal and by said clock signal to provide a differential NRZ signal as an output, and a differential decoder comprising an EXOR gate having an input driven by said differential NRZ signal and a delay circuit adapted to introduce a delay of the duration of 1-bit, said delay circuit being driven by said differential NRZ signal, and having an output which drives a second input of said EXOR gate, to provide a digital signal as output.

4,887,270

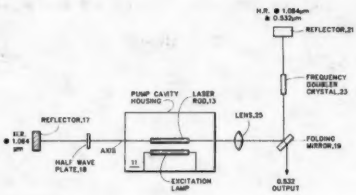
CONTINUOUS WAVE, FREQUENCY DOUBLED SOLID STATE LASER SYSTEMS WITH STABILIZED OUTPUT

William L. Austin, Tigard, Oreg., assignor to Eye Research Institute of Retina Foundation, Boston, Mass.

Continuation of Ser. No. 2,081, Jan. 12, 1987, abandoned, which is a continuation-in-part of Ser. No. 857,927, Apr. 30, 1986, abandoned. This application Nov. 29, 1988, Ser. No. 279,282

Int. Cl.[4] H01S *3/10*

U.S. Cl. 372—22 **6 Claims**



1. A laser system for providing a continuous wave, frequency-doubled light beam with a stable power output comprising:

a laser pump cavity;

an elongated Nd: YAG solid-state laser rod disposed in said pump cavity;

an excitation lamp generally coextensive with and positioned parallel to said rod within said pump cavity, said lamp providing output radiation at a frequency suitable for producing the emission of light radiation by laser action in said rod;

a filter positioned within said pump cavity between said lamp and said rod to screen output radiation from said lamp which is of a frequency not suited for exciting laser action with said rod;

a resonator mirror positioned at one end of said rod to reflect axial light back into said rod, said mirror reflecting light at the fundamental frequency of the light radiation emitted by said rod;

a folding mirror placed at the opposite end of said laser rod, said folding mirror reflecting substantialy all incident light at the fundamental frequency of the light radiation emitted from said laser rod and passing, as an output of said laser system, a light beam at a frequency twice said fundamental frequency;

a focusing reflector positioned to receive light reflected from said folding mirror and said focusing reflector, said crystal acting to double the frequency of incident light at the wavelength emitted by said rod;

focusing means for focusing the light radiation emitted by said rod into a small cross-sectional area within said solid-state frequency doubling crystal; and

cooling means substantially surrounding said rod along a substantial portion of its effective length for maintaining the temperature distribution pattern along the longitudinal surface of said rod substantially constant, thereby to maintain a stable power level in the light beam transmitted at said doubled-frequency as the output of said system and enabling said system to operate in a continuous wave mode, said cooling means including a cooling tube having fluid passed therethrough at a flow rate to produce substantially laminar flow of fluid adjacent the surface of said laser rod.

4,887,271

POWER SUPPLY FOR A LASER DIODE IN A COMMON MODULE

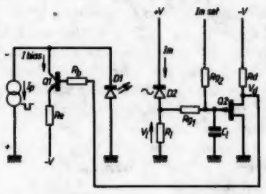
Stephen J. Taylor, Oxfordshire, United Kingdom, assignor to Plessey Overseas Limited, Ilford, England

Filed Aug. 19, 1988, Ser. No. 233,758

Claims priority, application United Kingdom, Aug. 19, 1987, 8719556

Int. Cl.[4] H01S 3/10

U.S. Cl. 372—29 4 Claims



1. A laser module forming a dual-in-line package comprising a printed circuit board having a multiplicity of terminals depending therefrom, a port for receiving the end of an optical fibre, a laser diode positioned at an inner end of the port on the printed circuit board, a photodetector positioned on the printed circuit board to receive light from the rear facet of the photodetector, and a power supply for the laser diode comprising an array of components mounted on the printed circuit board, the power supply including:

capacitive means coupled to said photodetector for integrating the signal from the photodetector, a field effect transistor having a gate, said capacitive means being coupled to said gate, a transistor means having a control electrode for the control of the main current path thereof, the main current path of said transistor means being coupled to the laser diode to control current flow thereto, and said field effect transistor being connected to said control electrode of the transistor means, whereby the power output of the laser diode is stabilised in operation.

4,887,272

LASER OSCILLATOR DEVICE

Norio Karube, Machida; Akira Egawa, Yamanashi; Etsuo Yamazaki, Hachioji; Nobuaki Iehisa, Yamanashi, and Mitsuo Manabe, Hachioji, all of Japan, assignors to Fanuc Ltd, Minamitsuru, Japan

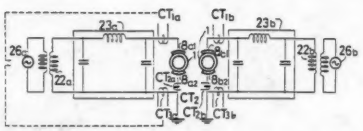
PCT No. PCT/JP88/00424, § 371 Date Dec. 20, 1988, § 102(e) Date Dec. 20, 1988, PCT Pub. No. WO88/08632, PCT Pub. Date Nov. 3, 1988

PCT Filed Apr. 28, 1988, Ser. No. 295,203

Claims priority, application Japan, Apr. 30, 1987, 62-107825

Int. Cl.[4] H01S 3/19

U.S. Cl. 372—38 7 Claims



1. A laser oscillator device for applying a high-frequency voltage to a plurality of discharge regions of discharge tubes through a dielectric to produce a high-frequency discharge for laser pumping, comprising:

high-frequency power supply means for converting a DC power supply into high-frequency power supply outputs in response to a feedback signal; and

current detector means for detecting currents flowing through the discharge tubes, said current detector means being positioned to detect mutual currents between adjacent discharge tubes, and for providing the feedback signal in response to the detected currents.

4,887,273

INTERCALATION COMPOUND AND GENERATOR OF COHERENT RADIATION USING THE SAME

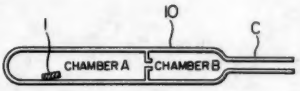
Kiichi Komatsubara, Tokorozawa; Seiichi Tanuma, Kiryu; Katsuya Okabe, Ota, and Toshio Katsuyama, Hachioji, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Mar. 25, 1986, Ser. No. 844,555

Claims priority, application Japan, Mar. 27, 1985, 60-60691; May 22, 1985, 60-108128

Int. Cl.[4] H01S 3/16

U.S. Cl. 372—41 17 Claims



1. A device for emitting coherent radiation comprising: an optical resonator containing an intercalation compound comprising a group of at least one atom layer as a host for forming a layer crystal substance and a group of at least one molecule layer of a compound as an intercalant, said compound as an intercalant being selected from the group consisting of $SiCl_4$, $GeCl_4$, $SnCl_4$, $PbCl_4$, NaBr, $GeBr_4$ and NaCl, and both groups being positioned alternately thereby forming an extremely stable intercalation compound, a resonant wavelength of the resonator corresponding to the distance between two molecule layers, and an exciting energy supplying means for supplying exciting energy to the intercalation compound so as to generate in the intercalation compound a standing wave, which is emitted as coherent radiation, said intercalation compound being produced by a process comprising placing the layer crystal compound in a heated atmosphere so as to intercalate the compound therein, and cooling the atmosphere compulsorily at a rate of 0.1 to 10° C./min.

4,887,274

DETERIORATION-RESISTANT SUPERLATTICE SEMICONDUCTOR LASER DEVICE

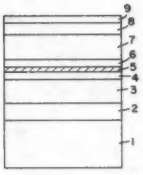
Toshiro Hayakawa, Nara; Takahiro Suyama, Tenri; Kosei Takahashi, Tenri, and Masafumi Kondo, Tenri, all of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Dec. 14, 1987, Ser. No. 132,520

Claims priority, application Japan, Dec. 15, 1986, 61-298175

Int. Cl.[4] H01S 3/19

U.S. Cl. 372—45 3 Claims



1. In a semiconductor laser device comprising a substrate and a quantum well region with a superlattice structure that functions as an active region on said substrate, the improvement which comprises said superlattice quantum well region that is composed of alternate layers comprising a plurality of first $Al_xGa_{1-x}As$ thin films and a plurality of second Al_yGa_{1-}

$-_xAs$ thin films ($0<x<y\leqq 1$, whereby deterioration of said superlattice quantum well region is suppressed.

4,887,275

HIGH-ENERGY LASER SYSTEM

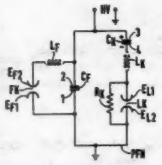
Hans-Jürgen Cirkel; Willi Bette, and Reinhard Müller, all of Erlangen, Fed. Rep. of Germany, assignors to Kraftwerk Union Aktiengesellschaft, Mülheim/Ruhr, Fed. Rep. of Germany

Continuation of Ser. No. 484,621, Apr. 13, 1983. This application Mar. 3, 1986, Ser. No. 837,564

Claims priority, application Fed. Rep. of Germany, Apr. 19, 1982, 3214480; Aug. 30, 1982, 3232225

Int. Cl.[4] H01S *3/097*

U.S. Cl. 372—83 **36 Claims**



1. High-energy TE laser system, comprising a laser head having an optical axis, a laser chamber with a gas space formed therein, at least two laser electrodes being disposed opposite each other and spaced apart in said laser chamber parallel to the optical axis of said laser head for producing a highly homogeneous arc-free capacitor discharge between said electrodes in said gas space for excitation, at least one rapid high-voltage switch, a pulse-forming network connected to said rapid high-voltage switch for producing high-voltage pulses at said laser electrodes with said rapid high-voltage switch, the pulses exciting the capacitor discharge, said pulse-forming network including first and second strip conductor capacitors respectively associated with said rapid high-voltage switch and with said laser head, said strip conductor capacitors including plates and dielectric layers disposed between said plates extended substantially normal to the optical axis of said laser head, forming a capacitor stack stacked substantially parallel to the optical axis of said laser head, said plates being connected in said pulse-forming network, said pulse-forming network being a Blümlein circuit in which at least one plate of said second strip conductor capacitor is connected to one of said laser electrodes, and said plates being divided into n adjacent plates sections having n−1 partings respectively disposed therebetween, and coupling inductances conductively connecting said plate sections to each other.

4,887,276

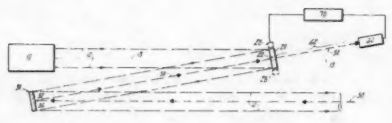
SHARED APERTURE SAMPLER

John H. Bluege, Lake Park, Fla., assignor to United Technologies, Hartford, Conn.

Filed Apr. 16, 1987, Ser. No. 39,037

Int. Cl.[4] H01S *3/08*

U.S. Cl. 372—103 **7 Claims**



1. A laser system comprising:

a laser for generating a laser output beam having a laser frequency range, a laser beam radius and traveling along an output beam axis in an output direction;

an optical train for transmitting and directing said laser output beam, for receiving a target return beam responsive to said laser output beam, and for directing said target return beam substantially along said output beam axis in a return direction opposite to said output direction;

a shared aperture optical sampler included in said optical train and having a first surface disposed to receive both said laser output beam and said target return beam, said first surface being refractive in said laser frequency range and transmissive in a second frequency range, and a second surface behind said first surface that is reflective in said second frequency range, whereby a sample portion of radiation in said target return beam that is within said second frequency range penetrates said first surface and is reflected from said second surface to form a sample target return beam;

optical detection means for receiving a selected portion of said sample target return beam and generating a return beam signal in response thereto;

control means connected to said optical detection means, for receiving said return beam signal and generating optical control signals; and

a controllable optical element within said optical train and connected to said control means, for adjusting said laser output beam in response to said optical control signals; characterized in that:

said second surface has a non-planar contour symmetric about said output beam axis and having a predetermined focal length to focus said sample target return beam;

said optical train includes a sampling optical element, having a sampler radius substantially different from said output beam radius and located along said output axis at a distance displaced from said shared aperture optical sampler in said return direction by approximately said predetermined focal length, whereby said sample target return beam is removed from said optical train.

4,887,277

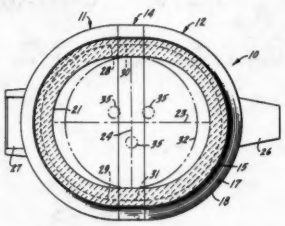
ELECTRIC ARC FURNACE

Charles W. Finkl, Evanston, Ill., assignor to A. Finkl & Sons Co., Chicago, Ill.

Filed Sep. 22, 1988, Ser. No. 247,838

Int. Cl.[4] F27D *1/00*; F27B *14/00*

U.S. Cl. 373—71 **8 Claims**



1. In an electric arc furnace of the type in which charge material is subjected to an arc under substantially atmospheric conditions and having a shell which includes a dished bottom and having upwardly extending side walls which define a major, lengthwise axis and a minor tilt axis about which said shell is adapted to be rotated, and means to facilitate rotation of said shell about said tilt axis, the improvement comprising the shell having an ob-round shape derived from steel enlargement means for increasing capacity of said furnace, said enlargement means comprising an intermediate wall section disposed midway between opposed hemispheres of said shell, the opposing

faces of said intermediate wall section being located in substantially parallel relationship to one another and to the major axis.

4,887,278

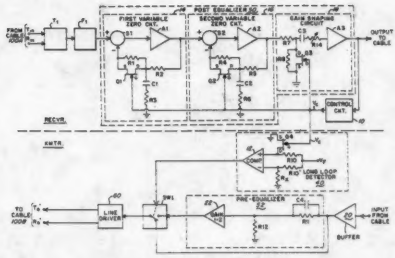
EQUALIZER FOR DIGITAL TRANSMISSION SYSTEMS

Dev V. Gupta, Flemington, N.J., assignor to Integrated Network Corporation, Bridgewater, N.J.

Continuation of Ser. No. 891,462, Jul. 29, 1986, Pat. No. 4,745,622. This application Sep. 23, 1987, Ser. No. 100,241

Int. Cl.[4] H04B *3/04*

U.S. Cl. 375—7 **9 Claims**



5. In a communication node coupled to a four wire full duplex telephone pulse signal communication network having a two wire receive path for receiving transmitted signals proceeding in one direction and a two wire transmit path for transmitting received signals in the direction from which said transmitted signals came, wherein the signal loss in said receive path and transmit path may exceed a given value, the improvement comprising a pre-equalizer, and first means responsive to the received transmitted signals in the receive path for determining when the signal loss in said receive path exceeds said given value and second means responsive to said first means for coupling said pre-equalizer into said transmit path for providing added gain to the transmitter signals to make the transmit path appear to be much shorter than it is.

4,887,279

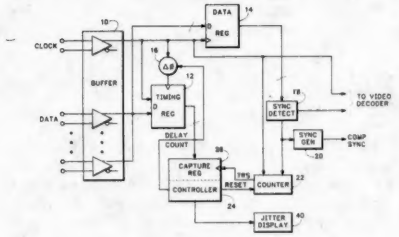
TIMING MEASUREMENT FOR JITTER DISPLAY

Ronald P. Odenheimer, Portland, Oreg., assignor to Tektronix, Inc., Beaverton, Oreg.

Filed Sep. 19, 1988, Ser. No. 246,052

Int. Cl.[4] H04B *17/00*

U.S. Cl. 375—10 **8 Claims**



1. A method of displaying a jitter timing measurement for a digital signal path with respect to a reference clock signal comprising the steps of:

acquiring a plurality of samples for a bit of a specified data word of a repetitive signal, the specified data word having a known value, from the digital signal path at each of a plurality of sample times relative to an edge of the specified data word for each cycle of the repetitive signal to produce a set of sample values for each sample time, the sample times being derived from the reference clock signal;

examining each set to determine a first sample time for a first set where all the sample values are no longer all at a first state and a second sample time for a second step where all the sample values are all at a second state; and

displaying the interval between the first sample time and the second sample time with respect to a reference time established by the reference clock signal.

4,887,280

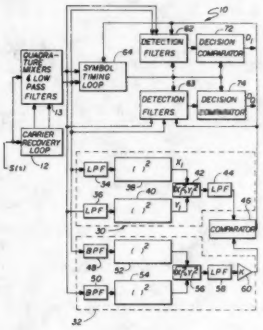
SYSTEM FOR DETECTING THE PRESENCE OF A SIGNAL OF A PARTICULAR DATA RATE

Sam Reisenfeld, Playa del Rey, Calif., assignor to Hughes Aircraft Company, Los Angeles, Calif.

Filed Dec. 29, 1986, Ser. No. 947,256

Int. Cl.[4] H04L *23/00*

U.S. Cl. 375—121 **17 Claims**



1. In a system for receiving a communication signal of known possible data rates, a system for detecting the presence of a signal of a particular data rate by detecting the energy distribution of said received signal comprising:

first filter means, having a first passband for filtering said received communication signal and providing a first filtered signal;

second filter means, having a second passband distinct from said first passband, for filtering said received communication signal and providing a second filtered signal;

first envelope detector means for detecting the power associated with said first filtered signal and providing an output indicative thereof;

second envelope detector means for detecting the power associated with said second filtered signal and providing an output indicative thereof; and

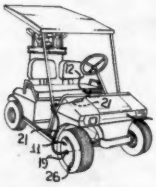
comparator means for comparing the output of said first envelope detector means to that of said second envelope detector means and for providing an output signal indicative thereof.

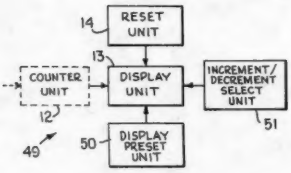
4,887,281

RECREATION VEHICLE DISTANCE MEASURING DEVICE

Carl S. Swanson, P.O. Box 4251, Brownsville, Tex. 78523

Continuation-in-part of Ser. No. 92,866, Sep. 3, 1987, Pat. No. 4,807,265. This application Apr. 11, 1988, Ser. No. 180,428
The portion of the term of this patent subsequent to Feb. 21, 2006, has been disclaimed.
Int. Cl.[4] G01C *22/00*
U.S. Cl. 377—24.1 3 Claims





1. A battery operated, distance measuring device for use with a recreation vehicle having a plurality of ground contacting rotating wheels, said device comprising:

(a) sensor means for sensing rotation of at least one of said wheels and for producing sensor signals in response thereto;

(b) counter means for responding to said sensor signals by incrementing a count related to rotation of said at least one wheel corresponding to a preselected standard distance measuring unit, and hence distance moved by said recreation vehicle;

(c) display means for displaying at least a portion of said count;

(d) reset means operable by an operator of asid vehicle for causing said display means and said counter means to reset;

(e) time limit means interconnecting said counter means with said battery and responsive to said sensor signals for allowing said count to be incremented so long as next received sensor signal occurs with a predetermined period of time with respect to a last received sensor signal;

(f) display preset means for allowing a predetermined count to be initially displayed on said display means; and

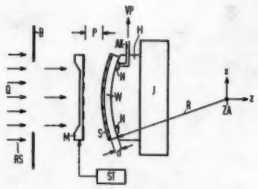
(g) decrement select means for causing said display means to decrement said predetermined count in response to said counter means.

4,887,282

METHOD AND APPARATUS FOR CHANGING THE IMAGING SCALE IN X-RAY LITHOGRAPH

Karl-Heinz Mueller, Berlin, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Nov. 10, 1987, Ser. No. 119,094
Claims priority, application Fed. Rep. of Germany, Nov. 18, 1986, 3639346
Int. Cl.[4] G21K *5/08*
U.S. Cl. 378—34 24 Claims



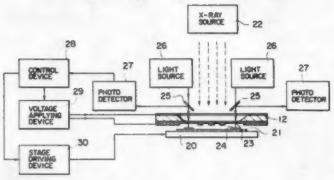
1. In a method for changing the imaging scale in x-ray lithography, said method including exposing an object by directing a beam of collimated x-radiation through a mask to transfer an image of a mask structure by parallel projection onto the object which is arranged in a direction of the beam to follow the mask, the improvement comprising changing the imaging scale of the image by deforming the object at least in the region to be exposed into a curved surface and maintaining the radius of curvature for the individual surface points of the area being deformed constant during the irradiation of the object.

4,887,283

X-RAY MASK AND EXPOSURE METHOD EMPLOYING THE SAME

Kunihiro Hosono, Itami, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Japan

Filed Mar. 22, 1989, Ser. No. 327,249
Claims priority, application Japan, Sep. 27, 1988, 63-243103
Int. Cl.[4] G21K *5/00*
U.S. Cl. 378—35 21 Claims



18. An exposure method comprising the steps of: disposing an X-ray mask above a substrate in alignment therewith, said X-ray mask having a membrane formed of a material which transmits X-rays, a mask pattern formed on the surface of said membrane, said mask pattern being made of an X-ray absorbing material, and a supporting frame formed of a material which is mechanically deformed in response to the application of an external signal, said supporting frame supporting said membrane;

correcting distortion in said mask pattern of an mask by the application of said external signal to said supporting frame of said mask; and

irradiating said substrate with X-rays through said mask so

as to transfer said mask pattern of said mask to said substrate.

4,887,284

METHOD OF CHECKING THE PRESENCE OR ABSENCE OF AN X-RAY SHEET FILM IN A CASETTE INTRODUCED INTO AN APPARATUS FOR UNLOADING OR LOADING A SHEET FILM INTO THE CASSETTE, AND A DEVICE FOR CARRYING OUT THE METHOD

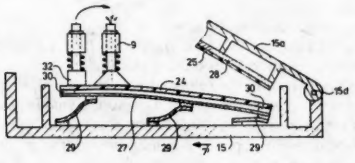
Walter Bauer, Munich; Manfred Schmidt, Kirchheim, and Ernst Widemann, Dachau, all of Fed. Rep. of Germany, assignors to AGFA - Gevaert Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed Jul. 20, 1988, Ser. No. 222,123

Claims priority, application Fed. Rep. of Germany, Aug. 4, 1987, 3725847

Int. Cl.[4] G03B *42/02*

U.S. Cl. 378—173 10 Claims



6. An apparatus for unloading or loading a X-ray sheet films into a cassette which includes a bottom part, an openable cover part hinged to the bottom part, sheet film supporting means arranged, in a rest position, in said bottom part and being mounted for a limited movement in vertical and horizontal directions and including an inductively or capacitively active element, the apparatus comprising a movable gripping member arranged for seizing a sheet film on said supporting means and displacing said sheet film out of said cassette when activated, an electronic control device for controlling the unloading and loading operation of the apparatus, a device for determining the presence or absence of an X-ray sheet film in a cassette after insertion of said cassette into the apparatus, said device including a proximity sensing switch arranged for detecting the position changes of said inductively or capacitively active element of said film supporting means and being connected to said electronic control device to control the operational sequence of said apparatus such that when said movable gripping element seizes a film present on said supporting means and lifts the film out of said bottom part of the cassette, the position of said supporting means together with said inductively or capacitively active element remains unchanged and no position change of the inductively or capacitively active element is signalled whereas in the absence of the film on the supporting means said gripping element seizes said supporting means and moves said supporting means together with said inductively or capacitively active element out of a rest position thereof so that the proximity switch senses the position change of the inductively or capacitively active element and delivers a corresponding signal to said electronic control device.

4,887,285

METHOD AND DEVICE FOR DETERMINING THE SPATIAL DISTRIBUTION OF CHEMICALS IN AN OBJECT

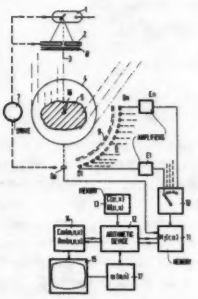
Geoffrey Harding, Halstenbek, and Josef-Maria Kosanetzky, Norderstedt, both of Fed. Rep. of Germany, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Mar. 11, 1987, Ser. No. 24,656

Claims priority, application Fed. Rep. of Germany, Mar. 18, 1986, 3608965

Int. Cl.[4] A61B *6/02*; G01N *23/08*

U.S. Cl. 378—88 11 Claims



4. A device for measuring a distribution of chemical elements in an object comprising

radiation means, including a radiation source, which scan a plane layer of the object with a narrow beam of primary radiation from a plurality of directions along a plurality of beam paths;

a plurality of detectors distributed adjacent said layer which measure the energy of radiation which is scattered in the object from said beam of primary radiation at a plurality of angles relative to each of said beam paths;

means which receive signals from said detectors and separately calculate values of Compton scattered radiation and Rayleigh scattered radiation which is scattered at a plurality of different angles from said beam of primary radiation at points along said beam paths;

computed tomography means which receive said values of Compton scattered radiation and Rayleigh scattered radiation and which calculate a differential scatter coefficient for Compton scattered radiation and a differential scatter coefficient for Rayleigh scattered radiation at each of a plurality of pixels in the layer;

a memory which stores scatter cross section data values for Compton scattered radiation and Rayleigh scattered radiation at different values of momentum transfer for a plurality of possible chemical elements which may be present in the object; and

means which use the stored cross section data values to calculate, for each of said pixels, ratios of relative contributions of radiation scattered from each of a plurality of chemical elements so that a superposition of differential scatter cross-sections for said elements, weighted by said ratios, is at least approximately proportional to said calculated scatter coefficients for Compton scattered radiation and for Rayleigh scattered radiation at each pixel.

4,887,286

X-RAY POSITIONING AID

Jack W. Seidenberg, 936 Madison Ave., Woodmere, N.Y. 11598

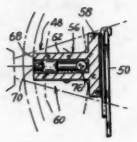
Filed Jul. 11, 1988, Ser. No. 217,190

Int. Cl.[4] G03B *42/02*

U.S. Cl. 378—170 8 Claims

1. Apparatus for assisting in the positioning of a dental X-ray

generating unit for the creation of an X-ray image of an internal target portion of the mouth on a film element, said mouth portion being separated from said X-ray generating unit by a soft-tissue facial portion, comprising a substantially X-ray-transparent body adapted to be mounted in the path of the X-rays within the mouth of the patient and between the X-ray generating unit and the film element, said body having an outwardly-directed face positioned essentially perpendicular



to the X-ray path and facing the soft-tissue facial portion between the X-ray source and target and a portion having a pair of opposed surfaces dimensioned to be gripped by the teeth of the patient, and illumination means mounted to said body for directing at least one beam of light perpendicular to and outwardly form said face towards said facial feature along the path of the X-rays generated by the generating unit to produce at least one light spot on said facial feature to serve as an orientation means for said X-ray unit.

4,887,287

MOBILE X-RAY APPARATUS COMPRISING EXCHANGEABLE WHEELS

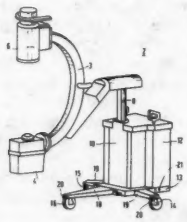
Johannes I. M. Cobben, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Nov. 4, 1988, Ser. No. 267,057

Claims priority, application Netherlands, May 6, 1988, 8801196

Int. Cl.[4] A61B *6/00, 6/10*

U.S. Cl. 378—198 **9 Claims**



1. A mobile x-ray diagnostic apparatus, comprising a C-arc on which an x-ray source and an x-ray detector are mounted opposite one another, and support means for said C-arc having a first set of ground wheels including two side wheels connected to said support means at respective first spaced-apart points for swiveling around vertical axes, characterized in that the x-ray diagnostic apparatus further comprises an exchangeable second set of ground wheels including two side wheels and that said support means further comprises means for detachably securing said exchangeable second set of ground wheels to said support means at respective second spaced apart points, and means for adjusting the height of the two side wheels of said exchangeable second set relative to said respective second points to enable transferring operative support of said apparatus from the side wheels of one of said first and second sets to the wheels of the other set.

4,887,288

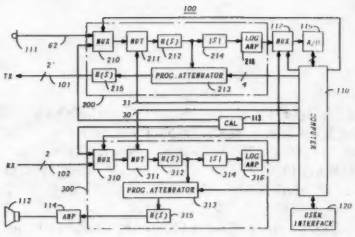
SELF CALIBRATION ARRANGEMENT FOR A VOICE SWITCHED SPEAKERPHONE

Richard H. Erving, Red Bank, N.J., assignor to American Telephone and Telegraph Company, New York, N.Y. and AT&T Information Systems Inc., Morristown, N.J.

Filed Dec. 28, 1988, Ser. No. 290,772

Int. Cl.[4] H04M *9/10*

U.S. Cl. 379—6 **8 Claims**



1. In a voice switching apparatus for processing speech signals on a communication line, the apparatus including means for switching between a receive state for receiving speech signals from the communication line and a transmit state for transmitting speech signals over the communication line, an electrical calibration circuit for determining the operational readiness of speech processing circuitry in the apparatus and comprising:

means for generating a tone signal;

means for coupling this tone signal in a loop configuration through the speech processing circuitry;

means for detecting the return of the tone signal;

means responsive to the return of the tone signal for measuring the form of said returned tone signal; and

calibration means operably responsive to the measuring means for adjusting threshold switching levels at which the apparatus switches between the receive state and the transmit state.

4,887,289

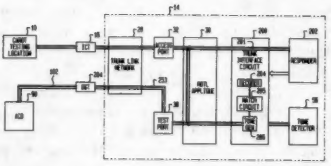
REMOTE TESTING OF A TRUNK LEADING TO AN AUTOMATIC CALL DISTRIBUTOR

David M. Montegari, West Hempstead, and Ronald M. Muller, Brooklyn, both of N.Y., assignors to New York Telephone Company, New York, N.Y.

Filed Aug. 29, 1988, Ser. No. 237,861

Int. Cl.[4] H04M *7/06, 3/28;* H04B *3/46*

U.S. Cl. 379—22 **10 Claims**



1. A circuit for use in a switching office of a telephone network to enable a trunk leading to an automatic call distributor to be automatically tested from a remote testing location, said circuit comprising:

means for determining if test priming information transmitted from said remote testing location to said switching

office contains an indication that a trunk leading to an automatic call distributor is to be tested, and

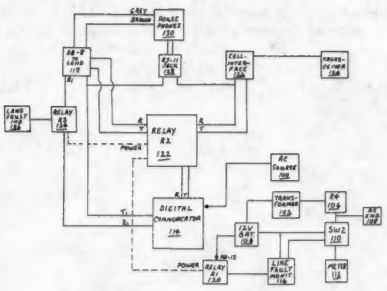
signalling means for transmitting a signal via the trunk to be tested to the automatic call distributor to cause a connection to be set up between the switching office and a test line associated with said automatic call distributor so that said trunk can be automatically tested from said remote testing location.

4,887,290

CELLULAR ALARM BACKUP SYSTEM

Dennis B. Dop, Antioch; Michael G. Freitag, Palos Park, both of Ill., and Norbert W. Zawacki, 10740 S. LaCrosse, Oak Lawn, Ill. 60453, assignors to Norbert W. Zawacki, Oak Lawn, Ill.

Filed Aug. 5, 1987, Ser. No. 83,496
Int. Cl.[4] H04M *11/04*; H04Q *7/04*
U.S. Cl. 379—33 13 Claims



1. In a security alarm system comprising alarm detection means for generating an output signal indicative of an alarm condition, means responsive to said output signal for generating a telephone call to a central security station, said means responsive to said output signal being coupled to a line of a land-based telephone system for making a telephone call in response to the input therein of said output signals, and means coupling said means responsive to said output signal to the telephone land-based system, wherein the improvement comprises:

a backup cellular transmission system for alternatively sending an alarm call from said means responsive to said output signal via a cellular telephone system, said backup cellular system comprising a cellular transceiver, a cellular interface means coupled to said cellular transceiver, and a first switch means coupled between said means responsive to said output signal and said cellular interface and said means coupling said means responsive to said output signal to the telephone land-based system; and

line fault detection means for detecting the inoperativeness of the telephone land-based system, said line fault detection means being coupled to said first switch means for controlling the state thereof to thereby automatically cause said first switch means to switch over from said telephone land-based system to the cellular system in response to said line fault detection mean's detection of a line fault on the land line system; and

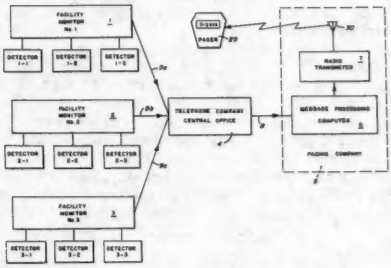
a telephone set coupled to said first switch means for making a call over said cellular backup system when said means responsive to said output signal is not activated and when said line fault detection means is activated in response to the loss of the telephone land-based system.

4,887,291

SYSTEM FOR ANNUNCIATING EMERGENCIES

James T. Stillwell, Silver Spring, Md., assignor to American Monitoring Systems, Inc., Ashton, Md.

Filed Jul. 23, 1987, Ser. No. 76,750
Int. Cl.[4] H04M *11/04*; G08B *25/00*
U.S. Cl. 379—39 6 Claims



5. A circuit means for interfacing with a communications line, said circuit means comprising:

a programmable computer connected to said communications line;

an electrical port comprising at least one pair of electrical leads and connected to said programmable computer, said port capable of sustaining a voltage between said leads, and

a power means connected to said port for supplying a voltage to said pair of electrical leads;

wherein said computer is effective to measure the voltage across said pair of leads;

said computer comprises means for transmitting an event message over said communications line, said computer comprising a memory;

said computer is effective to selectively cause said power means to apply a voltage positive with respect to circuit ground on one of said pair of leads, or apply a voltage positive with respect to circuit ground on the other of said pair of electrical leads;

said computer is effective to selectively reverse voltage polarity between said one and said other of said pair of leads;

wherein said computer is effective to:

receive in said memory one or more precoded annunciation messages;

receive in said memory a datum point corresponding to a reference voltage;

compare said reference voltage to said voltage across said pair of leads;

cause said means for transmitting said event message to transmit over said communications line a preselected one of said precoded annunciation messages responsive to said voltage across said pair of leads deviating from said reference voltage by a preselected amount, whereby said preselected one of said precoded annunciation messages becomes said event message;

wherein said programmable computer is effective to determine that said memory contains no reference voltage, and responsive to determining that said programmable memory contains no reference voltage, and in sequence:

measure the voltage drop across the pair of leads, and if said voltage across said pair of leads is non-zero, record said voltage drop across said pair of leads in said memory as a new said reference voltage, and cause said power means to be disenabled from applying any potential positive with respect to ground to either of said pair of leads;

if said voltage drop across said leads is zero, cause said

power means to apply a voltage positive with respect to ground to said one of said pair of leads;

measure the magnitude of voltage drop across said pair of leads;

if said voltage drop is non-zero, record said voltage drop in said memory as a new said reference voltage and disenable said power means from applying a voltage positive with respect to ground on said other said pair of leads;

if said voltage drop is zero, cause said power means to apply a voltage positive with respect to ground to said other of said pair of leads;

measure the magnitude of said voltage drop across said pair of leads;

if said voltage drop is non-zero, record said voltage drop in said memory as a new said reference voltage and disenable said power means from applying a voltage positive with respect to ground on said one of said pair of leads;

if said voltage drop is zero, record zero as a new said reference voltage and disenable said power means from applying a voltage positive with respect to ground on said other of said pair of leads.

4,887,292

ELECTRONIC LOCK SYSTEM WITH IMPROVED DATA DISSEMINATION

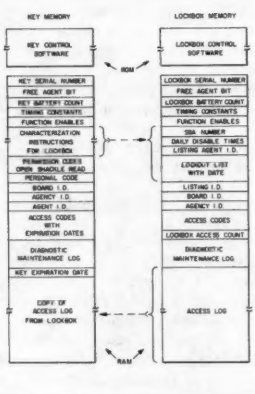
Philip D. Barrett; Walter G. Henderson, and Wayne F. Larson, all of Salem, Oreg., assignors to Supra Products, Inc., Salem, Oreg.

Continuation-in-part of Ser. No. 196,229, May 5, 1988, abandoned, which is a division of Ser. No. 15,864, Feb. 17, 1987, Pat. No. 4,766,746, which is a continuation-in-part of Ser. No. 831,601, Feb. 21, 1986, Pat. No. 4,727,368, which is a continuation-in-part of Ser. No. 814,364, Dec. 30, 1985, abandoned, which is a continuation-in-part of Ser. No. 788,072, Oct. 16, 1985, abandoned. This application Jan. 27, 1989, Ser. No. 303,625

The portion of the term of this patent subsequent to Aug. 30, 2005, has been disclaimed.

Int. Cl.[4] H04M *11/00*; E05B *49/00*

U.S. Cl. 379—103 **11 Claims**



1. An electronic lockbox system comprising:

a lockbox having a secure compartment and a lockable shackle;

an electronic key;

means for communicating access data between the lockbox and key;

means for determining from said communicated access data whether to authorize entry into the secure compartment of the lockbox;

memory means in the lockboxfor storing operational data relating to system operation;

means in the lockbox for storing first timeliness indicator data indicative of timeliness of the operational data in the lockbox memory means;

memory means in the key for storing operational data relating to system operation; and

means in the key for storing timeliness indicator data indicative of the timeliness of the operational data in the key memory means;

comparison means for comparing said first and second timeliness indicator data to determine if operational data in the key is more timely than operational data in the lockbox; and

means responsive to the comparison means for transferring operational data and associated timeliness indicator data from the key to the lockbox.

4,887,293

TRUNK CIRCUIT WITH LOOP LENGTH GAIN EQUALIZATION

Gerald Molnar, Ottawa, Canada, assignor to Mitel Corporation, Kanata, Canada

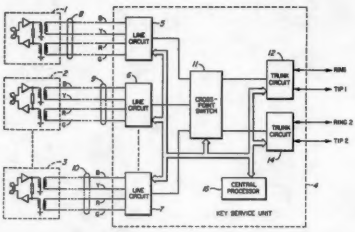
Continuation-in-part of Ser. No. 829,907, Feb. 18, 1986, Pat. No. 4,727,578. This application Feb. 22, 1988, Ser. No. 158,347

Claims priority, application Canada, Oct. 11, 1985, 492911

The portion of the term of this patent subsequent to Feb. 23, 2005, has been disclaimed.

Int. Cl.[4] H04M *1/00, 1/76*

U.S. Cl. 379—164 **7 Claims**



1. In a telephone system including voice switching means for connection to a plurality of subscriber sets via a plurality of local telephone conductors, and to at least one outside telephone line having a predetermined line impedance, a trunk circuit connected to each corresponding outside telephone line and to said switching means for connection to said telephone conductors for performing bidirectional signal translation between said telephone line and said conductors, said trunk circuit comprising means for performing loop length gain equalization of signals carried by a corresponding outside telephone line.

4,887,294

TELEPHONE AUTOMATIC REDIAL SYSTEM

Wu Ruey-Guang, Miao-Li Hsien, Taiwan, assignor to Industrial Technology Research Institute, Taiwan

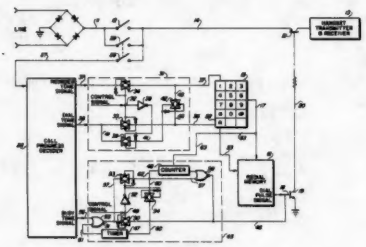
Filed May 19, 1988, Ser. No. 195,877

Int. Cl.[4] H04M *1/26*

U.S. Cl. 379—355 **3 Claims**

1. An automatic redialing system for telephones comprising a call progress decoder for detecting and generating signals in response to a dial tone and a busy tone on the telephone line, a redial memory capable of generating a dial pulse signal corresponding to the called number stored therein, and logic circuitry connecting said call progress decoder and said redial memory, said circuitry comprising a redial initiation circuit responsive to a dial tone output signal from the call progress decoder for signaling the redial memory to initiate a dial pulse signal, and a redial interrupt circuit responsive to a busy tone

signal from the call progress decoder for signaling an interruption to the redialing sequence, said redial interrupt circuit including timing means for temporarily interrupting the dialing sequence for predetermined periods of time between redials and counter means for interrupting the redialing sequence after said called number has been redialed a predetermined number



of times, said redial interrupt circuit further comprising an OR gate receiving input from the busy tone signal outputted from said call progress decoder and from said timer means, the output of said OR gate being connected to the input of a NOR gate, the other input of said NOR gate being connected to said counting means, the output of said NOR gate being employed to interrupt said redial sequence.

4,887,295

TELEPHONE INSTRUMENT

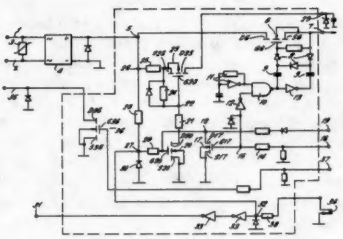
James O. M. Jenkins, Swansea, Wales, assignor to Siliconix Limited, Wales

Filed Jun. 8, 1987, Ser. No. 59,629

Claims priority, application United Kingdom, Jul. 14, 1986, 8617117

Int. Cl.[4] H04M *1/31*

U.S. Cl. 379—362 **4 Claims**



1. A telephone instrument having electronic operating circuitry, and comprising a rectifier to provide, from the telephone line voltage, a d.c. supply voltage of predetermined polarity for the electronic operating circuitry, a hookswitch operable to apply the d.c. voltage from the rectifier to all of said electronic operating circuitry only when the instrument is off-hook, a first FET switching transistor connected in series with the output of the rectifier to supply the d.c. voltage from the rectifier to the operating circuitry, a second FET switching transistor responsive to the status of the hookswitch and being arranged to provide a current conduction path necessary to provide an enabling voltage to a control terminal of the first FET switching transistor, and said circuitry causing the status of the hookswitch to determine the status of the said second FET switching transistor.

4,887,296

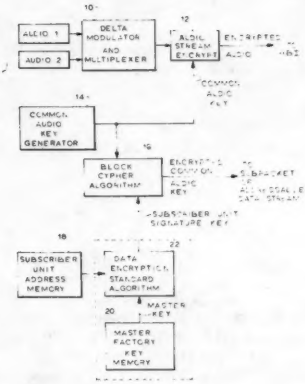
CRYPTOGRAPHIC SYSTEM FOR DIRECT BROADCAST SATELLITE SYSTEM

Donald R. Horne, Don Mills, Canada, assignor to Ricoh Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 665,114, Oct. 26, 1984, abandoned. This application Oct. 16, 1987, Ser. No. 113,333

Int. Cl.[4] H04L *9/02*

U.S. Cl. 380—21 **31 Claims**



22. A three key cryptographic method for secure information distribution from a transmission node to a plurality of receiver nodes wherein a first key, associated with more than one of the receiver nodes, is known only to the transmission node and each receiver node has a unique address number and a pre-stored unique second key which is a function of its address number, the method comprising the steps of selecting each receiver node in turn, generating the second key for (a) each selected receiver node by encrypting the address number for the selected node with the first key, generating a third key, encrypting the information to be distributed with the third key, encrypting the third key with the generated second key, the second key for a selected receiver node being generated in real time each time the receiver node is selected, so as to eliminate the necessity of storing and securing the generated second key for each of the receiver nodes, distributing the encrypted information to all receiver nodes, distributing the encrypted third key to the selected receiver node; receiving the distributed encrypted information and the encrypted third key at the selected receiver node, and decrypting the received encrypted information using the received encrypted third key and the stored second key for the selected receiver node.

4,887,297

APPARATUS FOR PROCESSING STEREO SIGNALS AND UNIVERSAL AM STEREO RECEIVERS INCORPORATING SUCH APPARATUS

Bernard D. Loughlin, Centerport, N.Y., assignor to Hazeltine Corporation, Greenlawn, N.Y.

Filed Dec. 1, 1986, Ser. No. 936,541

Int. Cl.[4] H04H *5/00*

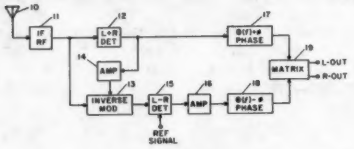
U.S. Cl. 381—15 **11 Claims**

1. A universal AM stereo receiver, comprising:

means for receiving radio frequency (RF) AM stereo signals and for converting said signals to a corresponding intermediate frequency (IF) signal;

stereo decoder means, responsive to said IF signal, for processing said signal through the same decoding circuitry, regardless of which type of AM stereo system signal is being received, said circuitry developing L and R stereo

audio output signals capable of producing stereo sound without the need for switching any stereo decoding cir-



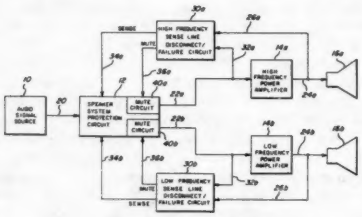
cuitry within said decoder means when any particular AM stereo system signal is being received.

4,887,298

ELECTRONIC CIRCUIT FOR SENSING DISCONNECT OR FAILURE OF A POWER OUTPUT SENSE LINE IN AN AUDIO POWER SYSTEM

Robert M. Haigler, Laguna Beach, Calif., assignor to Renkus-Heinz, Irvine, Calif.

Filed Jun. 15, 1988, Ser. No. 207,064
Int. Cl.[4] H03G *11/00*
U.S. Cl. 381—55 **10 Claims**



1. A protection circuit for an audio power system which includes an audio processor circuit that provides a first audio output signal to an audio power amplifier, said audio power amplifier providing an amplified audio output signal to a speaker, said audio processor circuit including a sense input for receiving a sense input signal proportional to the magnitude of the amplified audio output signal from said audio power amplifier, said processor circuit responsive to the magnitude of said sense signal to selectively reduce the magnitude of said first audio output signal, said protection circuit comprising:

a first input for receiving said sense input signal;

a second input for receiving a signal proportional to said first audio output signal from said processor circuit;

means for comparing said sense input signal with said first audio output signal and for generating a control signal when said sense input signal fails to change when said first audio output signal changes; and

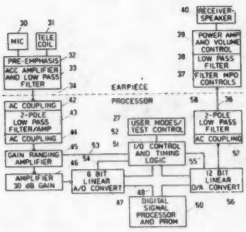
a mute circuit connected to the output of said processor circuit, said mute circuit responsive to said control signal to attenuate said first audio output signal when said sense signal fails to change when said audio output signal changes.

4,887,299

ADAPTIVE, PROGRAMMABLE SIGNAL PROCESSING HEARING AID

Kenneth L. Cummins; Kurt E. Hecox, and Malcolm J. Williamson, all of Madison, Wis., assignors to Nicolet Instrument Corporation, Madison, Wis.

Filed Nov. 12, 1987, Ser. No. 120,286
Int. Cl.[4] H04R *25/00*; H03B *29/00*
U.S. Cl. 381—68.4 **53 Claims**



1. A digital signal processing hearing aid system comprising:

(a) input means for providing an electrical signal corresponding to a sound signal;

(b) analog to digital converter means for converting the signal from the input means to digital data;

(c) digital signal processing means for receiving the digital data from the analog to digital converter means and providing processed output data and including a programmable memory selectably loaded with processing variables adapted to an individual user, the digital signal processing means including non-linear amplification means for providing digital output data which is a function of the time varying digital input signal data and a gain function of an estimated energy envelope of the digital input signal data, the gain function including at least a section providing expansion for selected low level input signals, a linear amplification section for providing constant amplification for intermediate level input signals, and a section providing compression for high level input signals, wherein the digital signal processing means further includes means for estimating the level of noise of the digital input signal data, and wherein a knee dividing the expansion section of the gain function from the linear section is moved higher or lower as a function of the noise level estimate while the position of the knee at which the linear section joins the compression section remains fixed and unaffected by the noise level estimate;

(d) digital to analog converter means for converting the data processed by the digital signal processing means to an analog signal; and

(e) means for converting the analog signal to a corresponding sound.

4,887,300

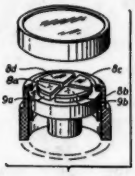
PRESSURE GRADIENT MICROPHONE

Frederiksen Erling, Holte, Denmark, assignor to Aktieselskabet Bruel & Kjaer, Naerum, Denmark

PCT No. PCT/DK87/00081, § 371 Date Mar. 7, 1988, § 102(e) Date Mar. 7, 1988, PCT Pub. No. WO88/00787, PCT Pub. Date Jan. 28, 1988
PCT Filed Jun. 25, 1987, Ser. No. 165,273
Int. Cl.[4] H04R *19/04, 19/00*
U.S. Cl. 381—168 **6 Claims**

1. Pressure gradient microphone comprising a membrane and a back electrode, the surface of either the membrane or the back electrode being a film of an electrostatically charged

material divided into n sections, characterised by one or several of the sections being permanently charged, the back elec-



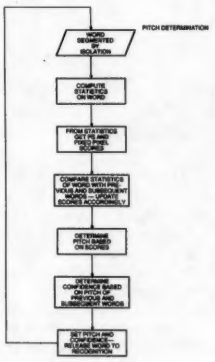
trode being electrically charged by means of an adjustable external voltage source.

4,887,301

PROPORTIONAL SPACED TEXT RECOGNITION APPARATUS AND METHOD

Thomas A. Hodgens, San Jose; Amy L. Lowrie, and James R. Murphy, both of Fremont, all of Calif., assignors to Dest Corporation, Milpitas, Calif.

Filed Jun. 5, 1985, Ser. No. 742,166
Int. Cl.[4] G06K 9/34
U.S. Cl. 382—9 **10 Claims**


PITCH DETERMINATION
WORD GENERATED BY ISOLATION
COMPUTE STATISTICS ON WORD
FROM STATISTICS DETERMINE PROPER SCORES
COMPARE STATISTICS OF WORD WITH PRECEDING AND SUBSEQUENT WORDS — UPDATE SCORES ACCORDINGLY
DETERMINE PITCH BASED ON SCORES
DETERMINE CONFIDENCE BASED ON PITCH OF PRECEDING AND SUBSEQUENT WORDS
SET PITCH AND CONFIDENCE — RELEASE WORD TO RECOGNITION

1. In an optical character recognition system, proportional spaced or fixed pitch text format recognition apparatus comprising

iterative processing means for receiving and recognizing first video data repreentative of text on a document,

means for determining the variation in spacing between centers of the characters of a particular word of the text,

means for determining the difference in the mean of the character spacing of said particular word and its neighboring words to provide recognition between said proportional spaced or fixed pitch text format, and

means for iteratively recognizing an accented character, in accordance with the output of said means for determining the difference, said means for iteratively recognizing including

first buffer means for iteratively storing textual video data representative of a base portion of said accented character, and

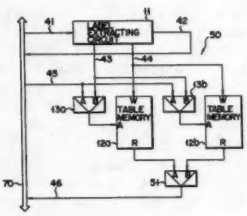
second buffer means for storing the accent portion of said accented character.

4,887,302

LABELLING CIRCUIT FOR IMAGE PROCESSOR

Yukio Urushibata, Tokyo, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Jun. 29, 1987, Ser. No. 67,245
Claims priority, application Japan, Jul. 2, 1986, 61-155704
Int. Cl.[4] G06K 9/34
U.S. Cl. 382—9 **6 Claims**



1. An image processing apparatus for intrinsically labelling respective figures of input image data, comprising:

a first data bus;

first image memory means, coupled to the first data bus, for storing first input pixel data transferred through the first data bus;

second image memory means, coupled to the first data bus, for storing second input pixel data transferred through the first data bus;

a second data bus, connected to the first image memory means and to the second image memory means;

label extracting means for:

(1) extracting linked pixel components of one of the first or the second input pixel data transferred through the second data bus,

(2) labelling the extracted linked pixel components in a predetermined order,

(3) generating first intermediate processed image data corresponding to the first input pixel data or second intermediate processed image data corresponding to the second input pixel data, and

(4) outputting first label data assigned to a predetermined input pixel data and second label data, different from the first label data and assigned to input pixel data which is of the same linked pixel components as the predetermined input pixel data, when a second label data exists which is assigned to input pixel data which is of the same linked pixel components as the input pixel data asigned with the first label data;

a third data bus connected to the label extracting means;

first intermediate image memory means, coupled to the third data bus, for storing first intermediate processed image data transferred through the third data bus;

second intermediate image memory means, coupled to the third data bus, for storing second intermediate processed image data transferred through the third data bus;

fourth data bus means connected to the first and second intermediate image memory means;

first select means for selecting and outputting either the first intermediate processed image data transferred through the fourth data bus, or the first label data of the first intermediate processed image data output from the label extracting means;

second select means for selecting and outputting the first label data of the second intermediate processed image data output from the label extracting means when the first select means outputs the first intermediate processed image data, and for selecting and outputting the second intermediate processed image data transferred through the fourth data bus when the first select means outputs the first label data;

first table memory means for storing the second label data of

the first intermediate processed data from the label data output means at an address designated by the first label data when the first select means outputs the first label data, the second label data stored at an address designated by the first intermediate processed image data being output from the first table memory means when the first select means outputs the first intermediate processed image data;

second table memory means for storing the second label data of the second intermediate processed image data from the label data output means in an address designated by the first label data when the second select means outputs the first label data, the second label data stored in the address designated by the second intermediate processed data being output from the second table memory means when the second select means outputs the second intermediate processed image data; and

third select means for selecting and outputting the second label data output from the second table memory means when the generating means outputs the first intermediate processed image data on the third data bus, and for selecting and outputting the second label data output from the first table memory means when the generating means outputs the second intermediate processed image data on the third data bus.

4,887,303

CHARACTER READING METHOD

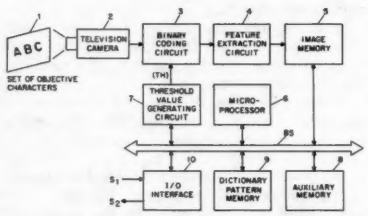
Yasuo Hongo, Tokyo, Japan, assignor to Fuji Electric Co., Ltd., Kawasaki, Japan

Continuation of Ser. No. 48,668, May 11, 1987, abandoned. This application Feb. 14, 1989, Ser. No. 310,488

Claims priority, application Japan, May 16, 1986, 61-110682

Int. Cl.[4] G06K 9/00

U.S. Cl. 382—34 **5 Claims**



1. In a device which comprises:

means for scanning an unknown character pattern and providing a video signal corresponding to an image of the unknown pattern, binary coding means for dividing the image into an array of pixels and converting the video signals into binary values using a threshold level, feature extracting means for converting the binary values corresponding to the pixels into segments corresponding to the image, memory means for storing the segments corresponding to the image, and operating means for performing reprogramming operations on the data stored in the memory means;

an improved method comprising the steps of:

obtaining repeatedly a bit matrix of an unknown character in a background pattern and decomposing it into a character component and a background component;

modifying a binary coded level in sequential order with respect to a dictionary character pattern;

statistically processing separately said character component and said background component of said individual bit matrices for obtaining horizontal, vertical and mask bit matrices for each category of characters;

storing said individual bit-matrices as dictionary patterns in a given memory;

obtaining evaluation indices on the basis of said individual bit-matrices of said character component and said background component, and of said horizontal, vertical and mask bit-matrices according to components of said dictionary patterns;

and recognizing said unknown character pattern from the results of processing the evaluation indices.

4,887,304

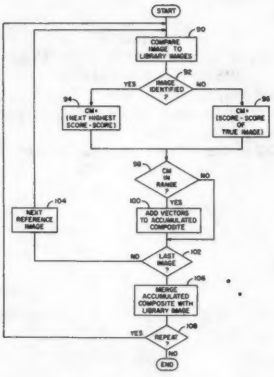
LIBRARY IMAGE OPTIMIZATION

John Terzian, Winchester, Mass., assignor to Raytheon Company, Lexington, Mass.

Continuation of Ser. No. 103,099, Sep. 30, 1987, abandoned. This application Mar. 16, 1989, Ser. No. 326,436

Int. Cl.[4] G06K 9/64

U.S. Cl. 382—30 **5 Claims**



1. In a process for identifying an unknown object by comparing a received image of the unknown object with each one of a plurality of reference images in a library of reference images, each reference image in the library being representative of an object of known classification, a method for forming each reference image in the library comprising the steps of:

(a) forming an initial library containing a plurality of reference images, each such reference image being the image of an object of an identifiable class of objects, and each such image being represented by a plurality of vertical vectors;

(b) generating a set of additional reference images, each of the reference images in the set being a different image of objects of the same class, and each such image being represented by a plurality of vertical vectors, the vectors in each such image being ordered such that each vector in each image corresponds to one vector in each of the other additional reference images; and

(c) computing a plurality of scores for each image in a set of additional reference images, each score representing the degree of similarity between the additional reference image and a different one of the reference images in the initial library and all images in the set of additional reference images being formed from objects in one class which the process for identifying an object can identify;

(d) forming a correlation margin for each image in the set of additional reference images, such correlation margin indicative of the degree to which the additional reference image differs from the reference in the initial library;

(e) forming an accumulated composite image by adding corresponding vertical vectors in all of the additional reference images with correlation margins in a range of values; and

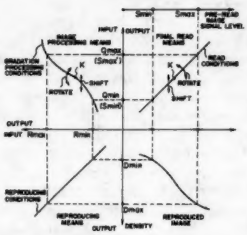
(f) forming a new library image by combining the accumulated composite image with the reference image in the initial library of the object of the same class as the objects used to form the additional reference images.

4,887,305

METHOD OF ADJUSTING READ-OUT CONDITIONS FOR RADIATION IMAGE

Kazuo Shimura, Kanagawa, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Mar. 18, 1988, Ser. No. 169,703
Claims priority, application Japan, Mar. 20, 1987, 62-67302
Int. Cl.[4] G03C 5/16; G03B 6/00; G06K 9/38
U.S. Cl. 382—51 7 Claims



1. A method of adjusting read-out processing conditions for a radiation image by calculating the maximum image signal level Smax and the minimum image signal level Smin of a desired image information range from image signals for condition adjustment which represent a radiation image, and adjusting the read-out processing conditions on the basis of the maximum image signal level Smax and the minimum image signal level Smin thus calculated,

wherein the improvement comprises the steps of:

obtaining image signals representing a radiation image, and applying differential processing to said image signals to obtain differentiated image signal values; and

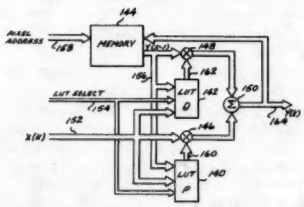
making a histogram of said differentiated image signal values and determining at least one of said maximum image signal level Smax and said minimum image signal level Smin on a basis of said histogram.

4,887,306

ADAPTIVE TEMPORAL FILTER FOR ULTRASOUND IMAGING SYSTEM

Juin-Jet Hwang, Redmond; William A. Hurt, Issaquah, and Ronald E. Daigle, Redmond, all of Wash., assignors to Advanced Technology Laboratories, Inc., Bothell, Wash.

Filed Nov. 4, 1987, Ser. No. 116,727
Int. Cl.[4] G06K 9/44
U.S. Cl. 382—54 22 Claims



1. In a medical ultrasound imaging system for producing a two-dimensional image of a subject, the imaging system including means for producing a plurality of pixel signals, each pixel signal comprising a time series of pixel values X(k), each pixel value being a function of the magnitude of an echo received from the subject at a particular sample volume, the improvement comprising:

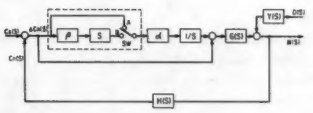
adaptive temporal filter means for filtering each pixel signal to produce a filtered signal comprising a time series of filtered values Y(k), such that for each pixel signal, the characteristic of the filter means varies as the magnitude of the pixel signal varies, each filtered value Y(k) being determined by computing a weighted sum that includes the terms P·X(k) and Q·Y(k−1), P and Q being coefficients and Y(k−1) being the prior filtered value, at least one coefficient being a function of Y(k−1).

4,887,307

SPEED CONTROL APPARATUS FOR ELECTRIC MOTOR

Akira Orii, and Takashi Nakamura, both of Tokyo, Japan, assignors to Janome Sewing Machine Co., Ltd., Tokyo, Japan

Filed Mar. 2, 1988, Ser. No. 162,867
Claims priority, application Japan, Mar. 6, 1987, 62-49916
Int. Cl.[4] G05B 5/00
U.S. Cl. 383—810 3 Claims



1. A speed control apparatus for an electric motor, comprising means to convert a rotating speed of the motor into a count value, a comparator which compares the count value produced by the conversion means and a count value conforming to a speed designation so as to produce an error count value, differential means to differentiate the error count value of said comparator every predetermined time and to change-over transfer functions dependency on a predetermined magnitude of the differentiated error count value, an error integrator which integrates either the error count value or the differentiated error count value every predetermined time, and a calculating unit which converts the sum of the error count value and the integrated error count value into a time value for controlling a power source for operating the motor.

4,887,308

BROADCAST DATA STORAGE AND RETRIEVAL SYSTEM

Bradley C. Dutton, 1033 S. Palmetto #J7, Ontario, Calif. 91762

Filed Jun. 26, 1987, Ser. No. 66,487
Int. Cl.[4] H04B 11/16
U.S. Cl. 455—156 1 Claim

1. A broadcast data storage and retrieval system comprising:

a continuous broadcast transmitting means radiating programming data;

said programming data composed of general programming data and selected coded data related to said general programming data;

receiver means for receiving said programming means;

data storage means operably coupled to said receiver means for storing said selected coded data;

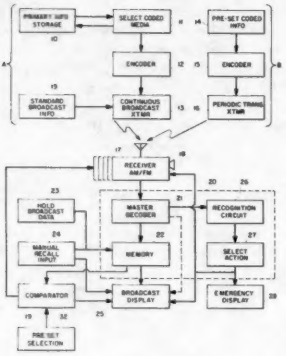
display means connected to said data storage means including a visual display;

manually operated means selectively coupled to said data storage means for transferring said selected coded data from said storage means to said display means;

said manually operated means comprises a hold broadcast data means coupled to said data storage means for selectively introducing said selected coded data of said programming data into said storage means and a manual

recall means coupled to said data storage means for transferring said selected coded data from said data storage means to said display means;

a periodic transmitting means radiating emergency information;



recognition circuits in said receiver responsive to reception of said emergency information for suppression of said programming data and the display thereof by said display means; and

said display means further includes a separate display for said emergency information.

4,887,309

OPTICAL REPEATER FOR FAULT TRACING IN AN OPTICAL TRANSMISSION SYSTEM

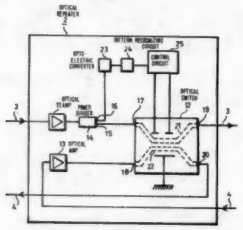
Ove B. Andersson, Vännäs; Johan Berg, Göteborg; Per O. Granestrand, Tyresö , and Armand Vatsel, Skärholmen, all of Sweden, assignors to Telefonaktiebolaget L M Ericsson, Stockholm, Sweden

Filed Jun. 13, 1988, Ser. No. 205,689

Claims priority, application Sweden, Jul. 16, 1987, 87028932

Int. Cl.[4] H04B *9/00*

U.S. Cl. 455—601 **7 Claims**



1. Apparatus for fault localizing in a two-way optical line link, comprising:

a first and a second end terminal each containing a transmitter and a receiver for respectively sending and receiving optical signals,

a first optical fibre cable between the transmitter on the first terminal and the receiver on the second terminal for transmitting optical signals in a first direction,

a second optical fibre cable between the transmitter in the second terminal and the receiver in the first terminal for transmitting optical signals in a second direction,

a plurality of cascade connected optical repeaters connected in a chain to both of said cables,

means for fault localizing whereby each of the repeaters in the chain are loop back connected in turn so that a test pattern sent by the transmitter in a transmitting terminal is fed back by a selected repeater to the receiver in said transmitting terminal, subsequent to which a comparison is made between a reference signal corresponding to the test pattern sent from the transmitter and the test pattern received in its receiver,

wherein at least one optical repeater includes;

a first optical amplifier connected to said first optical fibre cable for amplifying optical signals in the first direction,

a second optical amplifier connected to said second optical fibre cable for amplifying optical signals in the second direction, said transmitter during fault localizing transmits a test signal, said test signal including address bits and a test pattern, via said optical fibre cables,

a power divider for dividing transmitted signals into a first and a second part connected to the output of said first optical amplifier, said power divider having a first output to which said first part of a transmitted test signal is applied, and a second output to which said second part of the transmitted test signal is applied,

an optical switch for switching the test signal between said optical fibre cables having a first input connected to said first output on the power divider, a second input connected to an output on said second optical amplifier a first output connected to said first optical fibre cable and a second output connected to said second optical fibre cable,

an opto-electric converter is connected to said second input on the power divider for converting said second part of the test signal to an electric signal,

a pattern recognition circuit connected to an output on said converter for recognizing a repeater address in the test signal,

a control circuit for controlling the optical switch connected to an output on said pattern recognition circuit, said control circuit controlling the optical switch such that the test signal is applied to either said first or said second output of the optical switch and said pattern recognizing circuit in the selected repeater actuates said control circuit on detecting the repeater address, said control circuit then sending a control signal to the optical switch such that the switch assumes a switching position in which said first part of the test signal is switched from the first input of the switch to its second output so that the test signal is fed back to the receiver in the terminal which transmitted said test signal.

4,887,310

IDENTIFICATION SYSTEM USING A LASER RETRO-REFLECTING AND MODULATING SET

Jean L. Meyzonnette, Jouy en Josas; Bertrand Remy, Meudon La Foret, and Robert Pressiat, Ville D'Avray, all of France, assignors to Thomson CSF, Paris, France

Filed Jul. 24, 1987, Ser. No. 77,288

Claims priority, application France, Aug. 1, 1986, 86 11201

Int. Cl.[4] H04B *9/00*

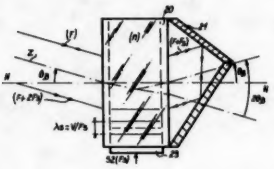
U.S. Cl. 455—604 **15 Claims**

1. A system of identification using a laser beam retro-reflecting and modulating device, said system comprising:

a retro-reflecting and modulating set having an acousto-optical defector which periodically receives an electrical signal from a control circuit, of a frequency to obtain a diffraction of a radiation beam in accordance with operating conditions of Bragg's law, said deflector being mechanically coupled with a catadioptric device placed downstream to receive radiation beam and to send back a diffracted radiation beam in the same direction and, after this radiation has passed through the deflector in the reverse direction, to produce a retro-reflection of the

radiation beam, the retro-reflection having a frequency shift with a value equal to twice a frequency of said control signal;

a mechanically separate laser transmitter/receiver set which is placed remotely from said retro-reflecting and modulating set and receives said retro-reflection therefrom, the transmitter producing a radiation in the direction of said retro-reflecting and modulating set and the receiver comprising circuits for detection and processing of said retro-



reflection sent back from said retro-reflection and modulation set; and

an optical scanning device for scanning a determined range in one plane, comprising a rotating, reflecting mirror, rotating on an axis orthogonal to said one plane, wherein the retro-reflecting and modulating set is servo-linked to the rotation of the mirror according to a determined ratio of a type which (a) makes it possible to preserve the diffraction conditions of Bragg's law, and (b) makes it possible to determine a deviation from a reference plane.

4,887,311

RADIO WITH OPTIONS BOARD

Terry N. Garner, Lynchburg, and Robert P. Dixon, Rustburg, both of Va., assignors to General Electric Company, Lynchburg, Va.

Filed Apr. 17, 1987, Ser. No. 39,331

Int. Cl.[4] H04B *1/40, 1/06*

U.S. Cl. 455—76 **58 Claims**

1. A digitally-controlled radio communication device comprising:

basic control processor means including means for operating in a first mode for controlling a first set of radio functions; and

option processor means, coupled to said basic control processor means, for controlling at least one additional radio function, said basic control processor means including means for sensing the presence of said option processor means and for operating in a second mode in response to sensing the presence of said options processor means, said option processor means including means for communicating with said basic control processor means to enable the basic control processor means to operate in said second mode to control the performance of said at least one additional radio control function.

4,887,312

METHOD AND APPARATUS FOR TRANSMISSION OF OPTICAL DATA BETWEEN TWO ELECTRICALLY SEPARATED TRANSMITTING RECEIVING UNITS

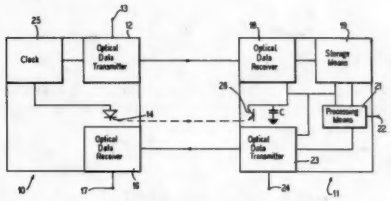
Friedrich Dannhaeuser, Munich, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Aug. 17, 1988, Ser. No. 232,938

Claims priority, application Fed. Rep. of Germany, Sep. 14, 1987, 3730843

Int. Cl.[4] H04B *9/00*

U.S. Cl. 455—607 **5 Claims**



1. A method for the optical data transmission of data between first and second transmitter-receivers which are spaced apart;

said first and second transmitter-receivers each has a data transmitter and a data receiver; the first transmitter-receiver has a light transmitter for transmitting light energy; the second transmitter-receiver has a light receiver for receiving the light energy transmitted by said first transmitter-receiver and said second transmitter-receiver has means for converting and storing the received light energy into electrical energy,

characterized by the successive steps of:

(a) transmitting by said first transmitter-receiver light energy for a predetermined time, receiving said light energy at said second transmitter-receiver and converting it inot electrical energy and storing said electrical energy to energize said second transmitter-receiver,

(b) sending with the data transmitter of said first transmitter-receive an auxiliary synchronization pulse during said predetermined time;

(c) simultaneously shutting off the emission of the light energy and of the auxiliary synchronization pulse at said first transmitter-receiver,

(d) and detecting and using the two, simultaneously appearing shut-off edges at the second transmitter-receiver as a synchronization signal.

4,887,313

METHOD AND APPARATUS FOR MAKING PHASE STABLE MICROWAVE MEASUREMENTS

Charles M. Luke, Cumming, and John B. Wilson, Lawrenceville, both of Ga., assignors to Scientific Atlanta, Inc., Atlanta, Ga.

Filed Jan. 27, 1987, Ser. No. 7,406

Int. Cl.[4] H04B *9/00*

U.S. Cl. 455—612 **9 Claims**

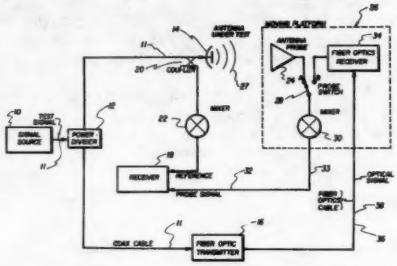
1. Apparatus for making phase stable microwave measurements comprising:

a. a signal source coupled to a transmitting antenna and a fiber optics transmitter;

b. a receiving antenna, a fiber optics receiver, and a means for selectively coupling either the fiber optics receiver or the receiving antenna to one end of a radio frequency transmitting cable, all mounted on a moveable platform;

c. a means for transmitting an optical signal

between the fiber optics transmitter and the fiber optics receiver; and



d. a receiver for making signal comparisons coupled to the signal source and the other end of the radio frequency transmitting cable.

4,887,314

OPTICAL FSK DEMODULATOR

Edward J. Carroll, Cambridge, and Nigel Walker, Ipswich, both of England, assignors to Plessey Overseas Limited, Ilford, England

Continuation of Ser. No. 111,842, Oct. 21, 1987, abandoned. This application Feb. 16, 1989, Ser. No. 312,591

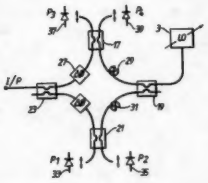
Claims priority, application United Kingdom, Oct. 23, 1986, 8625416

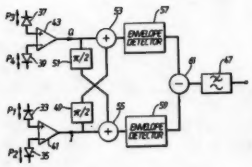
Int. Cl.[4] H04B 9/00

U.S. Cl. 455—619 **5 Claims**

1. A frequency shift keyed (FSK) optical signal demodulator for demodulating a two-tone FSK modulated optical input signal, the same comprising:

a local oscillator, tuned for providing a coherent optical reference signal of frequency that is midway between the two signal tones of said input signal; an optical multiport junction, coupled to the local oscillator at one input port and responsive to said input signal applied to another input port thereof, for providing phased combinations of the reference signal and the input signal at output ports thereof; detecting means, co-operative with the output ports of the multiport junction, to produce a plurality of





phase-diverse electical signals at a common beat frequency in response to the combined optical signals directed thereto; and,

phase discriminating means, co-operative with the detecting means, to produce a demodulated signal the amplitude of which is determined in dependance upon the lead/lag phase relationship of said electrical signals.

DESIGNS

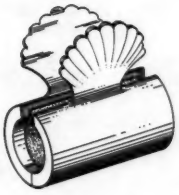
DECEMBER 12, 1989

304,975
PORTABLE BALL CONTAINER
Mark Movitz, 12 Bonn Pl., Weehawken, N.J. 07087
Filed Apr. 14, 1986, Ser. No. 851,668
Term of patent 14 years
U.S. Cl. D3—36

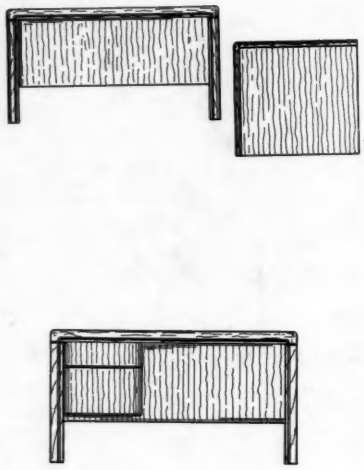
304,976
KEY-RING
Claude Grossiord, Annecy, France, assignor to S.T. DuPont, Paris, France
Filed Jun. 4, 1986, Ser. No. 870,688
Claims priority, application France, May 3, 1986, 861077
Term of patent 14 years
U.S. Cl. D3—61

304,977
GUN SLING
Angelo G. Pappas, 390 N. Center St., Wellington, Utah 84542
Filed May 9, 1986, Ser. No. 862,385
Term of patent 14 years
U.S. Cl. D3—101

304,978
CLAMP
William J. Harrington, 37 Jessie St., Swampscott, Mass. 01907
Filed Mar. 23, 1987, Ser. No. 29,598
Term of patent 14 years
U.S. Cl. D8—395

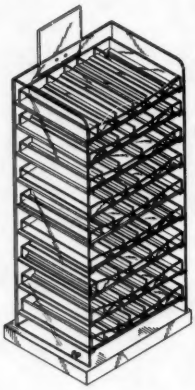


304,979
DESK OR SIMILAR ARTICLE
Paul S. Bush, Lakewood, N.Y.; Richard Bova, Corry, Pa., and Bruce Anderson, Jamestown, N.Y., assignors to Bush Industries, Inc., Jamestown, N.Y.
Division of Ser. No. 835,453, Mar. 3, 1986, Pat. No. 301,814. This application Oct. 31, 1988, Ser. No. 264,782
Term of patent 14 years
U.S. Cl. D6—422

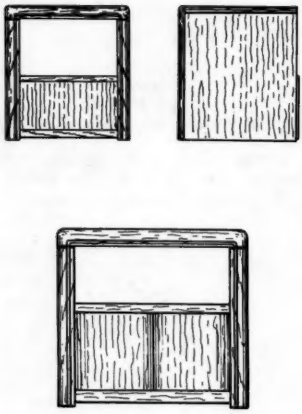


304,980
HUTCH OR SIMILAR ARTICLE
Paul S. Bush, Lakewood, N.Y.; Richard Bova, Corry, Pa., and Bruce Anderson, Jamestown, N.Y., assignors to Bush Industries, Inc., Jamestown, N.Y.
Division of Ser. No. 835,453, Mar. 3, 1986, Pat. No. Des. 301,814. This application Oct. 31, 1988, Ser. No. 264,764
Term of patent 14 years
U.S. Cl. D6—449

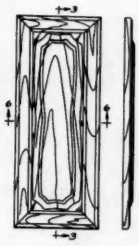
304,981
TIE DISPLAY RACK
Stuart I. Raskas, St. Louis, Mo., assignor to MMG Corporation, St. Louis, Mo.
Filed Feb. 12, 1987, Ser. No. 14,380
Term of patent 14 years
U.S. Cl. D6—478



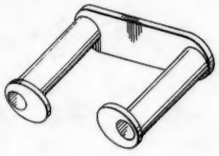
304,982
STAND OR SIMILAR ARTICLE
Paul S. Bush, Lakewood, N.Y.; Richard Bova, Corry, Pa., and Bruce Anderson, Jamestown, N.Y., assignors to Bush Industries, Inc., Jamestown, N.Y.
Division of Ser. No. 835,453, Mar. 3, 1986, Pat. No. Des. 301,814. This application Oct. 31, 1988, Ser. No. 264,501
Term of patent 14 years
U.S. Cl. D6—479



304,983
DOOR PANEL
James J. Palka, 22351 W. Thornridge Dr., Kildeer, Ill. 60047
Filed Jun. 5, 1987, Ser. No. 58,535
Term of patent 14 years
U.S. Cl. D6—492

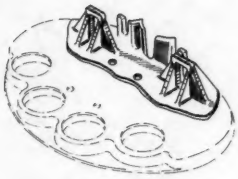


304,984
SKI RACK OR THE LIKE
John French, Gloucester, Canada, assignor to Tulipe International Inc., Ontario, Canada
Filed Aug. 28, 1987, Ser. No. 90,351
Claims priority, application Canada, Jun. 19, 1987, 19-06-87-2
Term of patent 14 years
U.S. Cl. D6—552

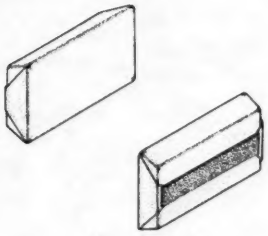


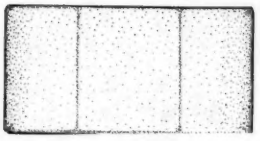
304,985
COMBINED MAGAZINE HOLDER AND DISPLAY FRAME
Audrey M. Raptis, 944 W. Del Mar, Mesa, Ariz. 85203
Filed Jun. 12, 1987, Ser. No. 61,176
Term of patent 14 years
U.S. Cl. D6—553

304,986
COMBINED BRACKET AND TRASH BAG SUPPORT FOR A POST-MOUNTED TRAY
William J. Rourke, 216 Circle Dr., Terre Haute, Ind. 47803
Filed Mar. 9, 1987, Ser. No. 23,750
Term of patent 14 years
U.S. Cl. D6—574

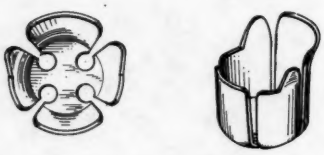


304,987
HEADREST
Robert D. Libenson, 2739 Colby Ave., West Los Angeles, Calif. 90064
Filed Dec. 2, 1986, Ser. No. 937,191
Term of patent 14 years
U.S. Cl. D6—601

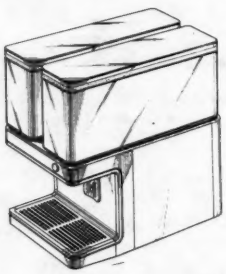




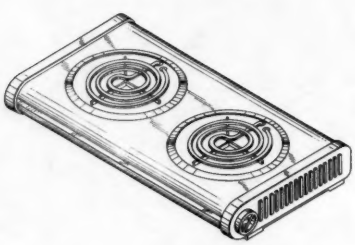
304,988
EGG HOLDER
Donald E. Omlie, 54100 Shelby Rd., Rochester, Mich. 48064
Filed Jun. 11, 1987, Ser. No. 60,707
Term of patent 14 years
U.S. Cl. D7—84.1



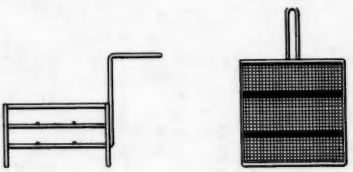
304,989
BEVERAGE DISPENSER
Gregory Fossella, Boston, Mass., assignor to Jet Spray Corp., Norwood, Mass.
Filed Jun. 12, 1986, Ser. No. 873,331
The portion of the term of this patent subsequent to Nov. 7, 2003, has been disclaimed.
Term of patent 14 years
U.S. Cl. D7—308



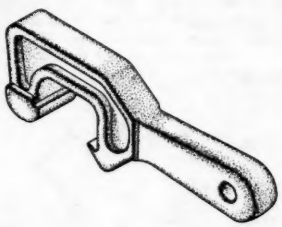
304,990
DOUBLE BURNER TABLE RANGE
Alan Springer, Portchester, N.Y., assignor to Morton Springer & Co., Inc., Paterson, N.J.
Filed Mar. 12, 1986, Ser. No. 842,872
Term of patent 14 years
U.S. Cl. D7—367



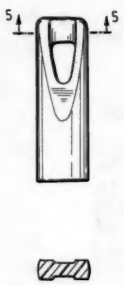
304,991
MULTI-LAYERED FRYING BASKET
Ronald R. Roberge, 81 Poor Farm Rd., Colchester, Vt. 05661
Filed Mar. 19, 1987, Ser. No. 27,681
Term of patent 14 years
U.S. Cl. D7—409



304,992
LID OPENER FOR PLASTIC PAIL
Bruce J. Matthies, Clarence, N.Y., assignor to Shur-Line, Inc., Lancaster, N.Y.
Filed Jul. 23, 1987, Ser. No. 76,664
Term of patent 14 years
U.S. Cl. D8—40



304,993
HANGING ATTACHMENT FOR TOOL HANDLES
Timo Sunila, Karjaa, Finland, assignor to Fiskars Oy Ab, Helsinki, Finland
Filed Mar. 25, 1986, Ser. No. 845,806
Claims priority, application Finland, Sep. 25, 1985, 713/85
Term of patent 14 years
U.S. Cl. D8—107

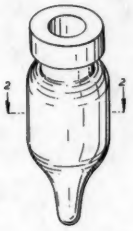


304,994
VEHICLE STARTER SWITCH AUXILIARY HANDLE
Thomas L. Harold, 825 Southridge, Osage City, Kans. 66523
Filed Jun. 12, 1987, Ser. No. 60,841
Term of patent 14 years
U.S. Cl. D8—308

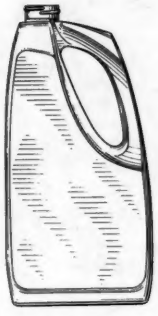
304,995
SIGN ANCHOR
Roger W. Gardner, 3072 Selkirk Dr., Boise, Id. 83702
Filed Feb. 2, 1987, Ser. No. 10,115
Term of patent 14 years
U.S. Cl. D8—373

304,996
DISPENSING CONTAINER
Detlef Hollenberg, Hilden; Hans Schneider, Schwalmtal; Albert Stoeffler, Duesseldorf, and Georg Weihrauch, Waldmichelbach, all of Fed. Rep. of Germany, assignors to Henkel Kommanditgesellschaft auf Aktien, Duesseldorf, Fed. Rep. of Germany
Filed Apr. 22, 1988, Ser. No. 186,977
Claims priority, application World Int. Prop. O., Oct. 23, 1987, DM/009 539
Term of patent 14 years
U.S. Cl. D9—[illegible]

304,997
SAMPLE VIAL
James A. Baxter, London, England, assignor to Chromacol Limited, London, England
Filed Nov. 19, 1985, Ser. No. 805,761
Claims priority, application United Kingdom, Jul. 25, 1985, 1028170
The portion of the term of this patent subsequent to Aug. 8, 2003, has been disclaimed.
Term of patent 14 years
U.S. Cl. D9—349



304,998
BOTTLE
John Pardo, Yonkers, N.Y., and Albert H. Torongo, Yardley, Pa., assignors to The Drackett Company, Cincinnati, Ohio
Filed Oct. 15, 1986, Ser. No. 919,338
Claims priority, application Canada, May 15, 1986, 15-06-86-1
Term of patent 14 years
U.S. Cl. D9—376



304,999
BOTTLE
Richard L. Platte, Sr., Ann Arbor, Mich., assignor to Sierra Spring Water Company, Houston, Tex.
Filed Sep. 2, 1986, Ser. No. 903,102
Term of patent 14 years
U.S. Cl. D9—376

305,000
BLISTER PACKAGE
Carlos Hernandez, Hialeah, Fla., assignor to Blispack Corp. A Florida Corporation, Hialeah, Fla.
Filed Jan. 12, 1987, Ser. No. 2,614
Term of patent 14 years
U.S. Cl. D9—415

305,001
CHEMISTRY ANALYZER TRAY
George L. Hayes, Towaco, and Douglas W. Fitzsimmons, Howell, both of N.J., assignors to Hoffman-La Roche Inc., Nutley, N.J.
Filed Jan. 7, 1987, Ser. No. 1,275
Term of patent 14 years
U.S. Cl. D9—425

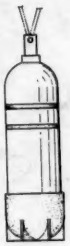
305,002
CHEMISTRY ANALYZER TRAY
George L. Hayes, Towaco, and Douglas W. Fitzsimmons, Howell, both of N.J., assignors to Hoffman-La Roche Inc., Nutley, N.J.
Filed Jan. 7, 1987, Ser. No. 1,272
Term of patent 14 years
U.S. Cl. D9—425

305,003
CHEMISTRY ANALYZER TRAY
George L. Hayes, Towaco, and Douglas W. Fitzsimmons, Howell, both of N.J., assignors to Hoffman-La Roche Inc., Nutley, N.J.
Filed Jan. 7, 1987, Ser. No. 1,273
Term of patent 14 years
U.S. Cl. D9—425

305,004
EXPANSION BRACELET
Murray L. Cowan, Norwood, Mass., assignor to Textron Inc., Providence, R.I.
Filed Dec. 29, 1987, Ser. No. 139,247
Term of patent 14 years
U.S. Cl. D11—19

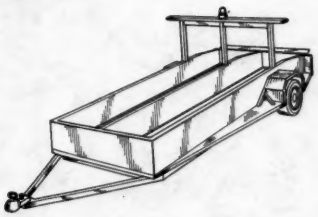
305,005
EXPANSION BRACELET
Murray L. Cowan, Norwood, Mass., assignor to Trexton Inc., Providence, R.I.
Filed Dec. 29, 1987, Ser. No. 139,249
Term of patent 14 years
U.S. Cl. D11—25

305,006
LOCKET
Brendon G. Nunes, 1035 Toy Avenue, Unit 6, Pickering, Ontario, Canada (L1W 3N9)
Filed Oct. 20, 1987, Ser. No. 110,492
Term of patent 14 years
U.S. Cl. D11—81

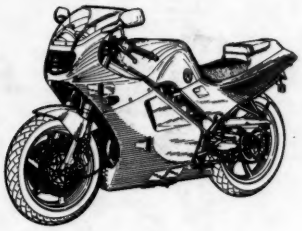


305,007
SLIDER BODY FOR SLIDE FASTENER
Minami Hiroo, Uozu, Japan, assignor to Yoshida Kogyo K. K., Tokyo, Japan
Filed Feb. 18, 1987, Ser. No. 15,966
Claims priority, application Japan, Jul. 14, 1986, 61-47452
Term of patent 14 years
U.S. Cl. D11—221

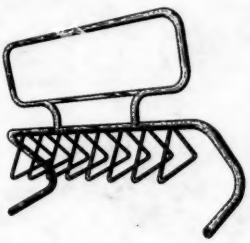
305,008
TRAILER
Robert Page, 72 Dwyer Avenue, Little Bay, N.S.W. 2036, Australia
Filed May 9, 1986, Ser. No. 862,401
Term of patent 14 years
U.S. Cl. D12—105



305,009
MOTORCYCLE
Kengo Kanazawa; Kenji Tako, and Takahiro Asakawa, all of Wako, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Japan
Filed Jul. 27, 1987, Ser. No. 78,250
Claims priority, application Japan, Jan. 27, 1987, 62-2822
Term of patent 14 years
U.S. Cl. D12—110



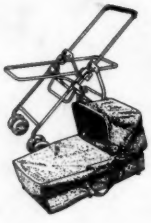
305,010
BICYCLE RACK
Thomas A. Rankin, P.O. Box 48199, Bentall Centre, Vancouver, British Columbia, Canada V7X 1N8
Filed Mar. 5, 1987, Ser. No. 22,335
Claims priority, application Canada, Nov. 26, 1986, 26-11-86-1
Term of patent 14 years
U.S. Cl. D12—115



305,011
STROLLER
Andrew Pipon, El Toro, Calif., assignor to Fun-Riders, El Toro, Calif.
Filed Sep. 21, 1987, Ser. No. 98,683
Term of patent 14 years
U.S. Cl. D12—129

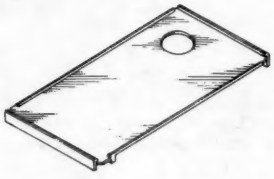
305,012
STROLLER
Jean Bigo, and Henri Pasquini, both of Cholet, France, assignors to Ampafrance S.A., Boulogne Billancourt, France
Filed Feb. 2, 1987, Ser. No. 10,158
Claims priority, application France, Jul. 31, 1986, 86 4320
Term of patent 14 years
U.S. Cl. D12—129

305,013
BABY CARRIAGE
Jean Bigo, and Henri Pasquini, both of Cholet, France, assignors to Ampafrance S.A., Billancourt, France
Filed Feb. 2, 1987, Ser. No. 10,124
Claims priority, application France, Jul. 31, 1986, 86 4320
Term of patent 14 years
U.S. Cl. D12—129



305,014
WHEEL-CHAIR
Adele E. Ward; O. R. K. Ward, Jr., both of Richmond Hill; Kevin R. Lunau, Mississauga, and A. E. Moore, L'Acadie, all of Canada, assignors to Canhart Industries, Inc., Ontario, Canada
Filed Jul. 17, 1987, Ser. No. 74,754
Claims priority, application Canada, Jan. 29, 1987, 29-01-87-5
Term of patent 14 years
U.S. Cl. D12—131

305,015
TRAY FOR AN INVALID WALKER
Cyril J. Roche, 567 Corbett Ave., San Francisco, Calif. 94114
Filed Sep. 2, 1986, Ser. No. 872,751
Term of patent 14 years
U.S. Cl. D12—133



305,016
AUTOMOBILE TIRE
Toshio Hayakawa, and Toru Tsuda, both of Higashimurayama, Japan, assignors to Bridgestone Corporation, Tokyo, Japan
Filed May 6, 1987, Ser. No. 46,492
Claims priority, application Japan, Dec. 4, 1986, 61-47790
Term of patent 14 years
U.S. Cl. D12—147

305,017

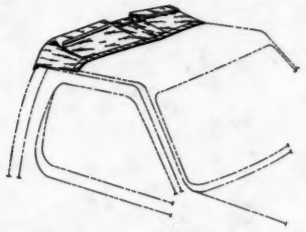
REAR CAB AIR SPOILER FOR PICK UP TRUCKS

James R. Lund, Champlin, Minn., assignor to Lund Industries, Inc., Minneapolis, Minn.

Filed Mar. 9, 1987, Ser. No. 23,299

Term of patent 14 years

U.S. Cl. D12—181



305,018

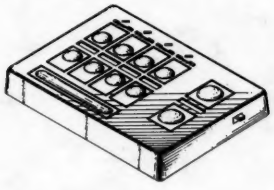
REMOTE WINDOW CONTROLLER

Oscar E. Pena, Eindhoven, Netherlands, and Peter T. Heyer, St. Paul, Minn., assignors to Andersen Corporation, Bayport, Minn.

Filed Mar. 18, 1988, Ser. No. 169,729

Term of patent 14 years

U.S. Cl. D13—35



305,019

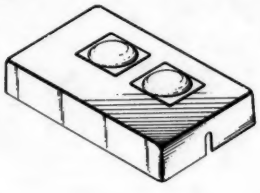
SINGLE WINDOW CONTROLLER

Oscar E. Pena, Eindhoven, Netherlands, and Peter T. Heyer, St. Paul, Minn., assignors to Andersen Corporation, Bayport, Minn.

Filed Mar. 18, 1988, Ser. No. 169,728

Term of patent 14 years

U.S. Cl. D13—38



305,020

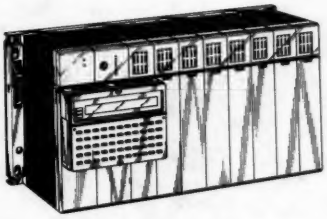
PROGRAMMABLE CONTROLLER

Kiichi Naoi; Yuichi Watanabe, and Hitoshi Manta, all of Tokyo, Japan, assignors to Koyo Electronics Industries Co., Ltd., Tokyo, Japan

Filed Aug. 26, 1986, Ser. No. 900,479

Term of patent 14 years

U.S. Cl. D13—12



305,021

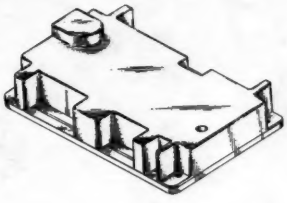
ELECTRONIC CONTROL MODULE ENCLOSURE

Ronald W. Bench, Kirkville, and Richard J. Duell, Syracuse, both of N.Y., assignors to Carrier Corporation, Syracuse, N.Y.

Filed Nov. 27, 1987, Ser. No. 126,142

Term of patent 14 years

U.S. Cl. D13—12



305,022

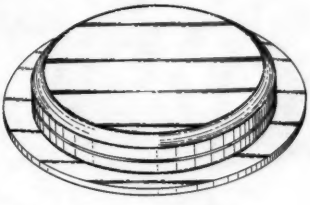
PRESSURE SENSITIVE PUSH BUTTON SWITCH

Leander Hallgren, St. Paul; Theodore R. Rudy, St. Louis Park, and Cheryl A. Waite, Shoreview, all of Minn., assignors to AbleNet, Minneapolis, Minn.

Filed May 23, 1985, Ser. No. 737,353

Term of patent 14 years

U.S. Cl. D13—32



305,023

INTEGRATED CIRCUIT CARD WITH MAGNETIC READING STRIP AND KEYBOARD AND DISPLAY

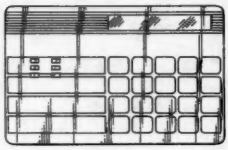
Shigeru Suto, Urawa, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Mar. 25, 1987, Ser. No. 29,972

Claims priority, application Japan, Sep. 25, 1986, 61-37572

Term of patent 14 years

U.S. Cl. D14—117



305,024

COMBINED RADIO AND TELEVISION RECEIVER

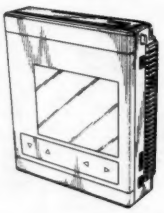
Hiroaki Nishiyori, and Hiroyuki Tsubaki, both of Osaka, Japan, assignors to Matushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Apr. 17, 1987, Ser. No. 39,482

Claims priority, application Japan, Dec. 15, 1986, 61-49613

Term of patent 14 years

U.S. Cl. D14—131



305,025

TELEPHONE

Iino Masaaki, Yokohama, Japan, assignor to Kabushiki Kaisha Toshiba, Kanagawa, Japan

Filed Mar. 8, 1988, Ser. No. 165,571

Claims priority, application Japan, Sep. 17, 1987, 62-37684

Term of patent 14 years

U.S. Cl. D14—151

305,026

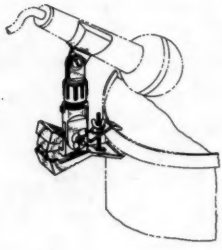
MICROPHONE HOLDER

Mitchell E. Wolf, 2450 S. 3200 West #4, West Valley City, Utah 84119

Filed Dec. 12, 1986, Ser. No. 941,281

Term of patent 14 years

U.S. Cl. D14—229



305,027
EXTENSION ATTACHMENT FOR A TELEPHONE EARPIECE

Harry Catey, 3330 91st St. Southeast, Everett, Wash. 98208, and Erling C. Hesla, 620 1112th St. Southeast; #157, Everett, Wash. 98208

Filed Jun. 15, 1988, Ser. No. 207,349
Term of patent 14 years
U.S. Cl. D14—249

305,028
EXHAUST GAS RECIRCULATION VALVE COVER

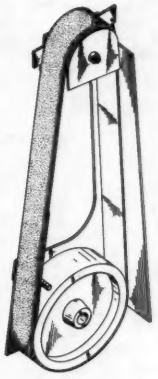
Carl H. Sherwood, Brockport, and Peter R. Wendt, Fairport, both of N.Y., assignors to General Motors Corporation, Detroit, Mich.

Filed Jul. 13, 1987, Ser. No. 72,614
Term of patent 14 years
U.S. Cl. D15—5

305,029
BELT TYPE ABRADING MACHINE

Richard W. Fuchs, 17 Deerfield La., Simsbury, Conn. 06070

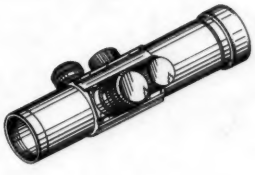
Filed Apr. 9, 1987, Ser. No. 36,276
Term of patent 14 years
U.S. Cl. D15—124



305,030
ILLUMINATED TELESCOPIC SIGHT OR SIMILAR ARTICLE

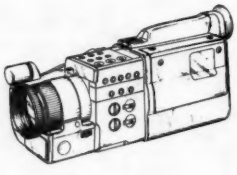
Susumu Fukushima, Tokyo, Japan, assignor to Tasco Sales, Inc., Miami, Fla.

Filed Apr. 21, 1988, Ser. No. 184,723
Term of patent 14 years
U.S. Cl. D16—132

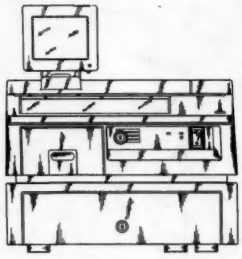


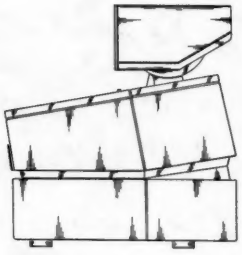
305,031
TELESCOPIC SIGHT OR SIMILAR ARTICLE
Susumu Fujushima, Tokyo, Japan, assignor to Tasco Sales, Inc., Fla.
Filed Apr. 21, 1988, Ser. No. 184,721
Term of patent 14 years
U.S. Cl. D16—132

305,032
COMBINED VIDEO TAPE RECORDER AND CAMERA
Takanori Nishiyama, Koganei; Shigeki Masatsugu, Sayama; Kouji Suso, and Yukinobu Ichkiawa, both of Tokyo, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan
Filed Aug. 22, 1986, Ser. No. 899,429
Claims priority, application Japan, May 6, 1986, 61/16519
Term of patent 14 years
U.S. Cl. D16—202



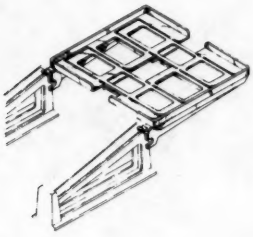
305,033
COMBINED POINT OF SALE TERMINAL AND CASH DRAWER
John A. Wiseman, Winchester, England, assignor to International Business Machines Corp., Armonk, N.Y.
Filed Mar. 17, 1986, Ser. No. 845,074
Term of patent 14 years
U.S. Cl. D18—4





305,034
SHEET FEEDER
Shin-ichi Hiroki, Tokyo, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan
Filed Oct. 14, 1986, Ser. No. 918,816
Claims priority, application Japan, Apr. 14, 1986, 61-13433
Term of patent 14 years
U.S. Cl. D18—22

305,035
COMPUTER PAPER TRAY
Jac H. Yon, Houston, Tex., and Brad Nemeth, San Francisco, Calif., assignors to Wendell R. Brooks, Inc., Ft. Worth, Tex.
Filed Dec. 19, 1986, Ser. No. 943,587
Term of patent 14 years
U.S. Cl. D18—22

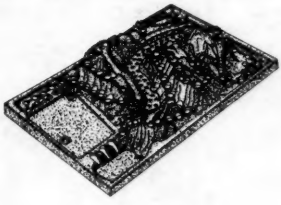


305,036
BOOKMARK
Harold E. Voetsch, 5905 Kilmer La., Indianapolis, Ind. 46250
Filed Sep. 24, 1986, Ser. No. 911,166
Term of patent 14 years
U.S. Cl. D19—34

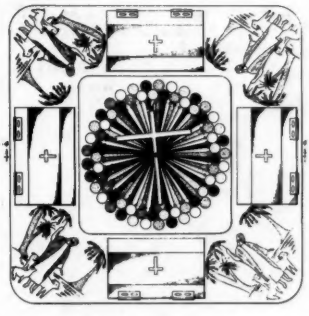
305,037
TAPE DISPENSER
Robert D. Gromer, Jr., Wyandotte County, Kans., assignor to Goldblatt Tool Co., Kansas City, Kans.
Filed Apr. 25, 1986, Ser. No. 857,792
Term of patent 14 years
U.S. Cl. D19—69

305,038
MARBLE GAME MAT
Kimberly J. Jones, West Des Moines, Iowa, assignor to Creative Athletic Products and Services, Inc., Des Moines, Iowa
Filed Feb. 2, 1987, Ser. No. 10,148
Term of patent 14 years
U.S. Cl. D21—14

305,039
THREE DIMENSIONAL GAME BOARD
Stanley J. Fudro, 2322 2nd St., NE., Minneapolis, Minn. 55418
Filed Aug. 19, 1986, Ser. No. 898,182
Term of patent 14 years
U.S. Cl. D21—17

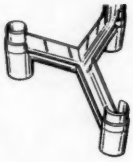


305,040
GAMEBOARD
Robert W. Jefferson, c/o Hattie Jenkins 3603 Drew St., Houston, Tex. 77004
Filed Nov. 26, 1986, Ser. No. 935,569
Term of patent 14 years
U.S. Cl. D21—22

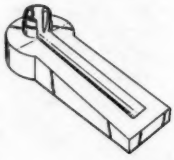


305,041
TOY CONSTRUCTION CONNECTOR ELEMENT
Harry Erickson, Vancouver, Canada, assignor to Arlington-Hews, Inc., Richmond, Canada
Filed Oct. 20, 1987, Ser. No. 110,437
Claims priority, application Canada, Sep. 29, 1987, 29-09-87-1
Term of patent 14 years
U.S. Cl. D21—108

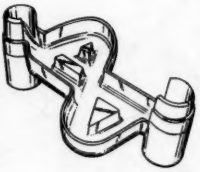
305,042
Y-INTERSECTION MARBLE RACE TOY
Daniel B. Klitsner, San Francisco, Calif., assignor to Discovery Toys, Inc., Martinez, Calif.
Filed Jul. 1, 1988, Ser. No. 214,712
Term of patent 14 years
U.S. Cl. D21—143



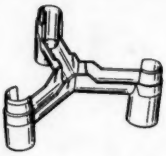
305,043
FINISHING LANE MARBLE RACE TOY
Daniel B. Klitsner, San Francisco, Calif., assignor to Discovery Toys, Inc., Martinez, Calif.
Filed Jul. 1, 1988, Ser. No. 214,711
Term of patent 14 years
U.S. Cl. D21—143



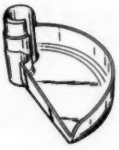
305,044
PASSING LANE MARBLE RACE TOY
Daniel B. Klitsner, San Francisco, Calif., assignor to Discovery Toys, Inc., Martinez, Calif.
Filed Jul. 1, 1988, Ser. No. 216,733
Term of patent 14 years
U.S. Cl. D21—143



305,045
SWITCH TRACK MARBLE RACE TOY
Daniel B. Klitsner, San Francisco, Calif., assignor to Discovery Toys, Inc., Martinez, Calif.
Filed Jun. 1, 1988, Ser. No. 214,083
Term of patent 14 years
U.S. Cl. D21—143

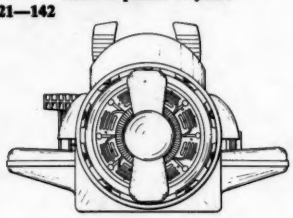


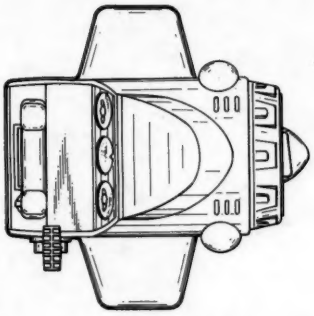
305,046
LANDING RAMP MARBLE RACE TOY
Daniel B. Klitsner, San Francisco, Calif., assignor to Discovery Toys, Inc., Martinez, Calif.
Filed Jul. 1, 1988, Ser. No. 214,280
Term of patent 14 years
U.S. Cl. D21—143



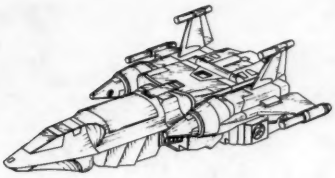
305,047
BANKED HAIRPIN MARBLE RACE TOY
Daniel B. Klitsner, San Francisco, Calif., assignor to Discovery Toys, Inc., Martinez, Calif.
Filed Jul. 1, 1988, Ser. No. 216,731
Term of patent 14 years
U.S. Cl. D21—143

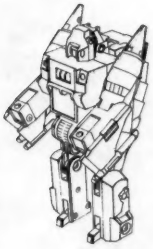
305,048
TOY AIRPLANE COCKPIT
David E. Moomaw, East Aurora, N.Y., assignor to The Quaker Oats Company, Chicago, Ill.
Filed Sep. 29, 1987, Ser. No. 102,090
Term of patent 14 years
U.S. Cl. D21—142

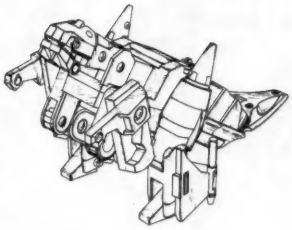




305,049
RECONFIGURABLE TOY DINOSAUR
Takashi Kunihiro, Abiko, Japan, assignor to Takara Co., Ltd., Tokyo, Japan
Filed Dec. 19, 1986, Ser. No. 944,595
Claims priority, application Japan, Oct. 6, 1986, 61-39481
Term of patent 14 years
U.S. Cl. D21—148







305,050

RECONFIGURABLE DOUBLE HEADED FIGURE TOY

Takayuki Ishizawa, Souka, Japan, assignor to Takara Co., Ltd., Tokyo, Japan

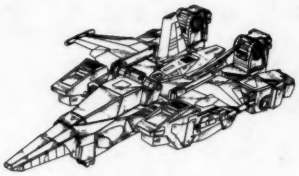
Filed Dec. 15, 1986, Ser. No. 942,586
Claims priority, application Japan, Oct. 29, 1986, 61-42845
Term of patent 14 years
U.S. Cl. D21—149

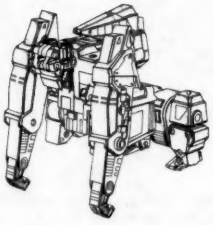
305,051

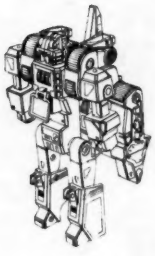
RECONFIGURABLE TOY GORILLA

Kouzin Ohno, Chiba, Japan, assignor to Takara Co., Inc., Tokyo, Japan

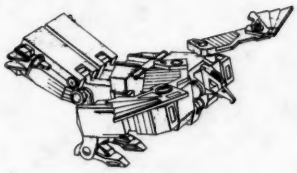
Filed Dec. 19, 1986, Ser. No. 944,596
Claims priority, application Japan, Oct. 6, 1986, 61-39480
Term of patent 14 years
U.S. Cl. D21—156

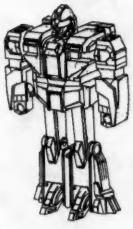




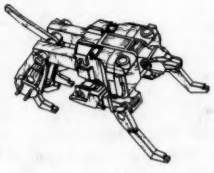


305,052
RECONFIGURABLE TOY HAWK
Takayoshi Doi, Ichikawa, Japan, assignor to Takara Co., Ltd., Tokyo, Japan
Filed Dec. 17, 1986, Ser. No. 943,913
Claims priority, application Japan, Oct. 17, 1986, 61-41438
Term of patent 14 years
U.S. Cl. D21—160

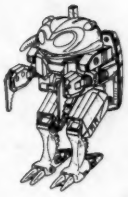


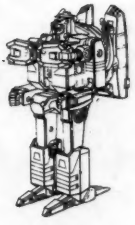


305,053
RECONFIGURABLE TOY PUMA
Takayoshi Doi, Ichikawa, Japan, assignor to Takara Co., Inc., Tokyo, Japan
Filed Dec. 17, 1986, Ser. No. 943,918
Claims priority, application Japan, Oct. 17, 1986, 61-41439
Term of patent 14 years
U.S. Cl. D21—163

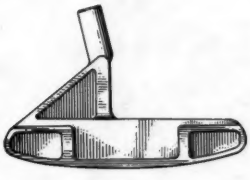


305,054
RECONFIGURABLE TOY INSECT
Takayuki Ishizawa, Souka, Japan, assignor to Takara Co., Ltd., Tokyo, Japan
Filed Dec. 15, 1986, Ser. No. 942,587
Claims priority, application Japan, Oct. 29, 1986, 61-42847
Term of patent 14 years
U.S. Cl. D21—185



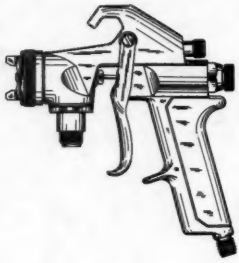


305,055
GOLF CLUB HEAD
Anthony J. Antonious, 205 E. Joppa Rd., Towson, Md. 21204
Filed May 28, 1986, Ser. No. 867,750
Term of patent 14 years
U.S. Cl. D21—217

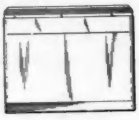


305,056
GOLF SHOE SPIKE TOOL
James E. Ricks, 6402 Monica Dr., Morrow, Ga. 30260
Filed Jun. 29, 1987, Ser. No. 67,142
Term of patent 14 years
U.S. Cl. D21—234

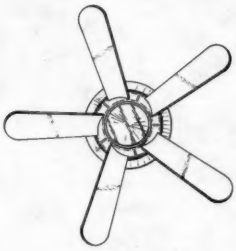
305,057
SPRAY GUN
Fredrick M. Morgan, Toledo, Ohio, assignor to The DeVilbiss Company, Toledo, Ohio
Filed Oct. 30, 1987, Ser. No. 116,134
Term of patent 14 years
U.S. Cl. D23—226



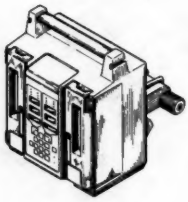
305,058
ELECTRIC STORAGE HEATER
Maurice H. Diamond, Armagh, Northern Ireland, assignor to Unidare Engineering Limited, Armagh, Northern Ireland
Filed Sep. 21, 1987, Ser. No. 98,876
Claims priority, application United Kingdom, Mar. 24, 1987, 1041007
Term of patent 14 years
U.S. Cl. D23—330



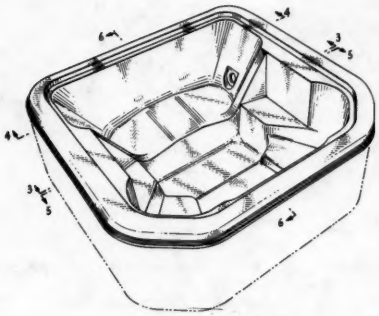
305,059
COMBINED CEILING FAN AND LIGHT
Pasquale Miranda, and Timothy Irish, both of New York, N.Y., assignors to Murray Feiss Import Corp., Bronx, N.Y.
Filed May 16, 1988, Ser. No. 194,590
Term of patent 14 years
U.S. Cl. D23—377

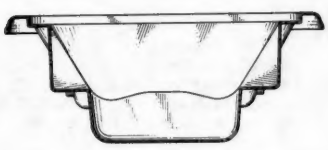


305,060
DUAL CHANNEL IV INFUSION PUMP
Jon Bisha', Mill Creek, Wash., and Michael R. Aten, San Diego, Calif., assignors to Fisher Scientific Company, Pittsburgh, Pa.
Filed Nov. 18, 1987, Ser. No. 122,006
Term of patent 14 years
U.S. Cl. D24—8

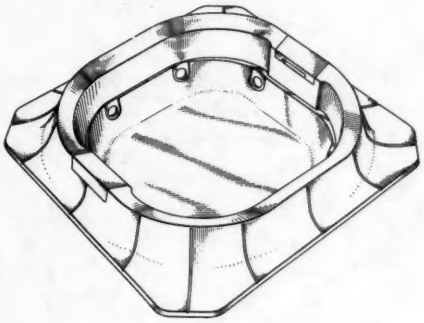


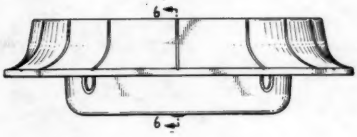
305,061
WHIRLPOOL SPA TUB
James R. Pauls, Concord, and Ralph D'Innocente, Pittsburg, both of Calif., assignors to Jacuzzi Whirlpool Bath, Walnut Creek, Calif.
Filed Sep. 4, 1987, Ser. No. 93,899
Term of patent 14 years
U.S. Cl. D24—38



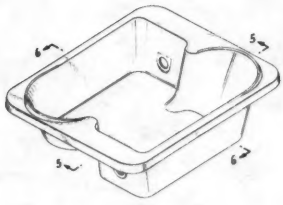


305,062
WHIRLPOOL BATH TUB
Roy A. Jacuzzi, Moraga; James R. Pauls, Concord, and Ralph D'Innocente, Pittsburg, all of Calif., assignors to Jacuzzi Inc., Little Rock, Ark.
Filed Sep. 15, 1988, Ser. No. 244,471
Term of patent 14 years
U.S. Cl. D24—38

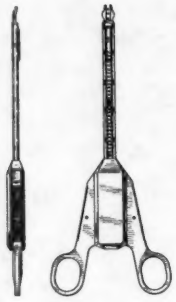




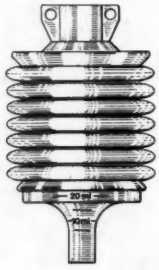
305,063
WHIRLPOOL BATH TUB
Roy A. Jacuzzi, Moraga; Ralph D'Innocente, Pittsburgh, and Peter K. Pruscha, Oakley, all of Calif., assignors to Jacuzzi Whirlpool Bath, Walnut Creek, Calif.
Filed Sep. 4, 1987, Ser. No. 93,901
Term of patent 14 years
U.S. Cl. D24—38



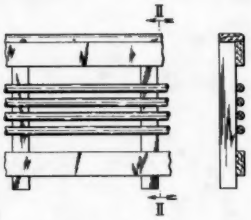
305,064
SURGICAL CLIP APPLIER
Paul J. Mulhauser, New York, and Christopher J. Brooks, Glen Cove, both of N.Y., assignors to Richard-Allan Medical Industries, Inc., Richland, Mich.
Filed May 22, 1987, Ser. No. 53,418
Term of patent 14 years
U.S. Cl. D24—47



305,065
BELLOWS FOR SURGICAL DRAINAGE
Udo P. Büchel, Billdal, and Kjell I. Wellenstam, Gothenburg, all of Sweden, assignors to Astra Meditec Aktiebolag, Molndal, Sweden
Continuation-in-part of Ser. No. 509,167, Jun. 29, 1983, abandoned. This application Aug. 22, 1986, Ser. No. 899,526
Claims priority, application Sweden, Feb. 19, 1983, 83-0143
Term of patent 14 years
U.S. Cl. D24—51

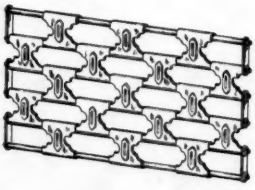


305,066
DECK RAILING
Kyle J. Humphrey, 311 Aspinwall, Troy, Mich. 48098
Filed Oct. 19, 1987, Ser. No. 110,483
Term of patent 14 years
U.S. Cl. D25—38



305,067
GLASS DOOR
Arden L. Borgen, Des Moines, Iowa, assignor to Margaret Platt Borgen, Des Moines, Iowa
Filed Mar. 29, 1989, Ser. No. 331,531
Term of patent 14 years
U.S. Cl. D25—48

305,068
ROLLING GATE GRILLE
Vincent Greco, 65 Rockledge Dr., Pelham Manor, N.Y. 10803
Continuation-in-part of Ser. No. 776,480, Sep. 16, 1985, Pat. No. Des. 297,463. This application May 9, 1988, Ser. No. 191,479
Term of patent 14 years
U.S. Cl. D25—50

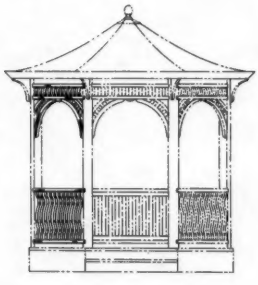


305,069
DOOR LIGHT FRAME
David A. De Block, and Kert E. Artwick, both of Holland, Mich., assignors to ODL, Incorporated, Zeeland, Mich.
Filed Apr. 10, 1986, Ser. No. 851,381
Term of patent 14 years
U.S. Cl. D25—60

305,071
LANTERN STAND
Leslie K. Tripp, 2936 Gorden Cir., Salt Lake City, Utah 84115
Filed Jul. 24, 1986, Ser. No. 889,074
Term of patent 14 years
U.S. Cl. D26—138

305,072
HAIR TREATMENT EAR GUARD
Carolyn Ferguson, 9612 Marlowe, Detroit, Mich. 48226
Filed Feb. 8, 1988, Ser. No. 153,853
Term of patent 14 years
U.S. Cl. D28—9

305,070
SIDE PANEL FOR A GAZEBO
James E. Dalton, 906 Cottman Ave., Philadelphia, Pa. 19111
Filed Dec. 23, 1986, Ser. No. 946,241
Term of patent 14 years
U.S. Cl. D25—152



305,073

ELECTRIC SHAVER

Kuniyuki Shimoo, Hyogo; Toyomi Arita, Osaka, and Kazuo Takada, Nara, all of Japan, assignors to Sanyo Electric Co., Ltd., Osaka, Japan

Filed Apr. 7, 1987, Ser. No. 35,305

Claims priority, application Japan, Oct. 8, 1986, 61-39886

Term of patent 14 years

U.S. Cl. D28—49

305,074

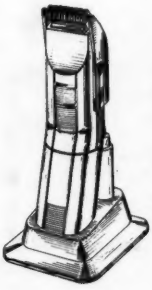
COMBINED HAIR CLIPPER, BASE AND ACCESSORIES THEREFOR

Robert A. Mockovak, Newton, Conn., assignor to Remington Products, Inc., Bridgeport, Conn.

Filed May 13, 1987, Ser. No. 49,682

Term of patent 14 years

U.S. Cl. D28—53



LIST OF PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 12TH DAY OF DECEMBER, 1989

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

A. B. Chance Company: *See—*
Roberts, Gerald B.; and West, Edward L., 4,886,945, Cl. 200-144.00R.

A B Oriental Trading Company, Inc.: *See—*
Yee, David T.; Lin, Eric; and Yee, Fang-Tung, 4,886,289, Cl. 280-643.000.

A. Finkl & Sons Co.: *See—*
Finkl, Charles W., 4,887,277, Cl. 373-71.000.

A. H. Robins Company, Incorporated: *See—*
Walsh, David A., 4,886,794, Cl. 514-211.000.

A/S De Danske Sukkerfabrikker: *See—*
Marcker, Kjeld A.; and Jensen, Jens S., 4,886,753, Cl. 435-172.300.

A/S Ferrosan: *See—*
Watjen, Frank; and Engelstoft, Mogens, 4,886,797, Cl. 514-220.000.

A/S Niro Atomizer: *See—*
Christensen, Mogens A., 4,885,848, Cl. 34-57.00R.

Aaltonen, Olli; Martikainen, Antti; Rantala, Borje; Ekstrom, Jan; and Toikka, Osmo, to Instrumentarium Corp. Tubular water separator for a gas analyzer. 4,886,528, Cl. 55-158.000.

Abbott Laboratories: *See—*
Arvidson, Russell A.; Renick, James T.; Clegg, Robert D.; and Zimmer, Lawrence E., 4,886,504, Cl. 604-257.000.

Abdo, Suheil F.: *See—*
Kokayeff, Peter; and Abdo, Suheil F., 4,886,935, Cl. 585-737.000.

Abe, Shinya: *See—*
Yamagishi, Youji; Akasaka, Kozo; Suzuki, Takeshi; Miyamoto, Mitsuaki; Nakamoto, Kouji; Okano, Kazuo; Abe, Shinya; Ikuta, Hironori; Hayashi, Kenji; Yoshimura, Hiroyuki; Fujimori, Tohru; Harada, Koukichi; and Yamatsu, Isao, 4,886,834, Cl. 514-521.000.

Achterwinter, Norbert; and Hax, Wolfgang, to Reifenhauser GmbH & Co. Maschinenfabrik. Winding up a foil web, particularly a foil web of synthetic material. 4,886,219, Cl. 242-58.600.

ACT Laboratories, Inc.: *See—*
Hankison, Paul M., 4,886,369, Cl. 366-165.000.

Activational Systems, Inc.: *See—*
Chiodo, Chris, 4,885,945, Cl. 73-863.320.

Adachi, Minoru; and Kizawa, Takashi, to Adachishin Industrial Co., Ltd. Rotary body of hard material with plastic supporter. 4,886,377, Cl. 384-49.000.

Adachishin Industrial Co., Ltd.: *See—*
Adachi, Minoru; and Kizawa, Takashi, 4,886,377, Cl. 384-49.000.

Adams, Edward L.: *See—*
Maki, Melvin C.; Feller, Walter J.; and Adams, Edward L., 4,887,069, Cl. 340-552.000.

Ade, Reiner: *See—*
Lohr, Herbert; Stein, Bernd; Becker, Helmut; Ade, Reiner; and Baur, Walter, 4,885,900, Cl. 53-551.000.

Adir Et Cie: *See—*
Lavielle, Gilbert; and Lepagnol, Jean, 4,886,799, Cl. 514-233.500.

Adise, Herbert H. Card game playing aid. 4,886,272, Cl. 273-148.00R.

Advanced Micro Devices, Inc.: *See—*
Moyal, Miki Z., 4,887,085, Cl. 341-169.000.
Mu, Albert T., 4,887,148, Cl. 357-74.000.
Tran, Dung Q., 4,887,241, Cl. 365-230.060.

Advanced Technology Laboratories, Inc.: *See—*
Hwang, Juin-Jet; Hurt, William A.; and Daigle, Ronald E., 4,887,306, Cl. 382-54.000.

Aebli, Beat M.; and Gremmelmaier, Claude, to Ciba-Geigy Corporation. Process for the preparation of indolines. 4,886,887, Cl. 548-490.000.

Agency of Industrial Science and Technology: *See—*
Utsunomiya, Shin; Okumura, Mitsuhiro; and Morita, Takeshi, 4,886,108, Cl. 164-461.000.

AGFA - Gevaert Aktiengesellschaft: *See—*
Bauer, Walter; Schmidt, Manfred; and Widemann, Ernst, 4,887,284, Cl. 378-173.000.
Berthold, Werner; Marx, Paul; and Ohlschlager, 4,886,737, Cl. 430-372.000.

Agintec AG: *See—*
Maier, Hans P., 4,886,433, Cl. 418-55.000.

Agroteam Consultants Ltd. 2: *See—*
Cohen, Amir, 4,886,211, Cl. 239-222.170.

Aidlin Automation Corp.: *See—*
Aidlin, Samuel S.; Aidlin, Stephen H.; and Kincaid, Larry, 4,886,567, Cl. 156-423.000.

Aidlin, Samuel S.; Aidlin, Stephen H.; and Kincaid, Larry, to Aidlin Automation Corp. Plastic composite bottles and method and apparatus for their fabrication. 4,886,567, Cl. 156-423.000.

Aidlin, Stephen H.: *See—*
Aidlin, Samuel S.; Aidlin, Stephen H.; and Kincaid, Larry, 4,886,567, Cl. 156-423.000.

Air-Flo Mfg. Co. Inc.: *See—*
Musso, Charles S., Jr.; and Musso, Tom W., 4,886,214, Cl. 239-676.000.

Air Products and Chemicals, Inc.: *See—*
Graf, Hans-Juergen, 4,886,178, Cl. 215-247.000.
Patel, Nitin M.; and Wang, Shoou-I, 4,886,651, Cl. 423-359.000.

Air-Shields, Inc.: *See—*
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Aisin Seiki Kabushiki Kaisha: *See—*
Ito, Sadao, 4,887,017, Cl. 318-626.000.
Maeda, Hiroaki; and Nakamura, Masahiko, 4,885,960, Cl. 74-866.000.
Sugiyama, Masanori; Masutani, Takayoshi; and Shirai, Takao, 4,887,024, Cl. 324-61.00R.
Yamada, Takahiro, 4,887,091, Cl. 343-714.000.

Akada, Mitsuo: *See—*
Torii, Shigeru; Taniguchi, Masatoshi; Sasaoka, Michio; Tomotaki, Yoshihisa; Akada, Mitsuo; Tanaka, Hideo; Suzuki, Akira; and Yamashita, Shiro, 4,886,891, Cl. 549-434.000.

Akahori, Kiyokazu: *See—*
Nagano, Hirosaku; Kawai, Hideki; and Akahori, Kiyokazu, 4,886,874, Cl. 528-353.000.

Akasaka, Kozo: *See—*
Yamagishi, Youji; Akasaka, Kozo; Suzuki, Takeshi; Miyamoto, Mitsuaki; Nakamoto, Kouji; Okano, Kazuo; Abe, Shinya; Ikuta, Hironori; Hayashi, Kenji; Yoshimura, Hiroyuki; Fujimori, Tohru; Harada, Koukichi; and Yamatsu, Isao, 4,886,834, Cl. 514-521.000.

Akesaka, Toshio, to Kabushiki Kaisha Iseki Kaihatsu Koki. Shield tunneling machine. 4,886,394, Cl. 405-141.000.

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Akesson, Yngve, to Nestec S.A. Utilization of fish waste. 4,886,676, Cl. 426-289.000.

Akita, Yoshisuke: *See—*
Takeuchi, Kunihiko; Akita, Yoshisuke; and Hayakawa, Osamu, 4,886,422, Cl. 417-20.000.

Akiya, Takashi; and Hasegawa, Kenji, to Canon Kabushiki Kaisha. Recording medium and ink-jet recording process employing the same. 4,887,097, Cl. 346-135.100.

Akiyama, Koji: *See—*
Tanaka, Eiichiro; Takimoto, Akio; Akiyama, Koji; Onomichi, Kyoko; Watanabe, Masanori; and Sakahara, Chisato, 4,886,719, Cl. 430-58.000.

Aktieselskabet Bruel & Kjaer: *See—*
Erling, Frederiksen, 4,887,300, Cl. 381-168.000.

Aktogu, Nurgun; and Clemence, Francois, to Roussel Uclaf. 17-aza-20,21, dinoreburnamenines. 4,886,802, Cl. 514-250.000.

Akutagawa, Susumu: *See—*
Mitsuhashi, Shigeru; Kondo, Hitoshi; Okazaki, Tetsuharu; Endoh, Shinji; Kudo, Hiroko; Yamaguchi, Akio; Tsuruta, Haruki; and Akutagawa, Susumu, 4,886,623, Cl. 252-299.650.

Akutsu, Fumio: *See—*
Ota, Masanori; Akutsu, Fumio; and Takahashi, Kazuo, 4,886,857, Cl. 525-74.000.

Akzo America Inc.: *See—*
Hardy, Thomas A.; and Walsh, Edward N., 4,886,895, Cl. 558-161.000.

Albarella, James P.; Noell, J. Oakey; Vogelhut, Paul O.; and Ward, deceased, Frederick E., to Miles Inc. Functionalized conducting polymers and their use in diagnostic devices. 4,886,625, Cl. 252-500.000.

Aldag, Reinhard: *See—*
Boettcher, Andreas; Fischer, Martin; Aldag, Reinhard; and Bluemel, Thomas, 4,886,735, Cl. 430-332.000.

Alexander, William, to American Colloid Company. Flexible grout composition and method. 4,886,550, Cl. 106-74.000.

Alkco Manufacturing Company: *See—*
Brown, Tobias A.; Roos, Scott L.; Biancalana, Donald D.; and Westgaard, Donald J., 4,887,196, Cl. 362-148.000.

Alkhazov, Tofik G.: *See—*
Ismagilov, Zinfer R; Zamaraev, Kirill I.; Khairulin, Sergei R.; Alkhazov, Tofik G.; Ismagilov, Foat R.; Ivanov, Alexei A.; Barannik, Georgy B.; Kerzhentsev, Mikhail A.; Nemkov, Valentin V.; and Parmon, Valentin N., 4,886,649, Cl. 423-230.000.

Allard, Deborah A.: *See—*
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Batts, Inc.: *See*—
Blanchard, Russell O., 4,886,195, Cl. 223-85.000.

Bauer, Rudolf: *See*—
Griss, Gerhart, deceased; Schneider, Claus; Hurnaus, Rudolf; Kobinger, Walter; Pichler, Ludwig; Bauer, Rudolf; Mierau, Joachim; Hinzen, Dieter; and Schingnitz, Gunter, 4,886,812, Cl. 514-321.000.

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Baur, Gunter: *See*—
Scheuble, Bernhard; Baur, Gunter; and Fehrenbach, Waltraud, 4,886,344, Cl. 350-350.00R.

Baur, Walter: *See*—
Lohr, Herbert; Stein, Bernd; Becker, Helmut; Ade, Reiner; and Baur, Walter, 4,885,900, Cl. 53-551.000.

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Lovgren, Eric M.; and El-Tibi, Abdul-Kader A., 4,886,506, Cl. 604-280.000.

Bayer Aktiengesellschaft: *See*—
Fest, Christa; Findeisen, Kurt; Brandes, Wilhelm; Dutzmann, Stefan; Hanssler, Gerd; and Reinecke, Paul, 4,886,832, Cl. 514-477.000.
Franckowiak, Gerhard; Bechem, Martin; Gross, Rainer; Hebisch, Siegfried; and Schramm, Matthias, 4,886,804, Cl. 514-252.000.
Franckowiak, Gerhard; Marhold, Albrecht; Bechem, Martin; Gross, Rainer; Kayser, Michael; Schramm, Matthias; and Thomas, Gunther, 4,886,816, Cl. 514-338.000.
Gayer, Herbert; Jelich, Klaus; Lunkenheimer, Winfried; Brandes, Wilhelm; and Hanssler, Gerd, 4,886,833, Cl. 514-521.000.
Gross, Rainer; and Schramm, Matthias, 4,886,820, Cl. 514-356.000.
Mormann, Werner; and Leukel, Gabriele, 4,886,902, Cl. 560-106.000.
Niewohner, Ulrich; Hoever, Franz-Peter; Lieb, Folker; Rosentreter, Ulrich; Perzborn, Elisabeth; Fiedler, Volker-Bernd; and Seuter, Friedel, 4,886,898, Cl. 560-42.000.
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Sirrenberg, Wilhelm; Marhold, Albrecht; and Wachendorff-Neumann, Ulrike, 4,886,823, Cl. 514-364.000.
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Fischer, Melchior; and Gaiffi, Nazareno, 4,886,645, Cl. 422-186.180.

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Soderquist, Charles E.; and Beck, James P., 4,886,431, Cl. 417-477.000.

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Woollenweber, William E.; and Beck, Niels J., 4,885,911, Cl. 60-597.000.

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Lohr, Herbert; Stein, Bernd; Becker, Helmut; Ade, Reiner; and Baur, Walter, 4,885,900, Cl. 53-551.000.

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Haynes, John L.; and Mansour, James D., 4,886,505, Cl. 604-265.000.
Mehl, Jack J.; Wasek, Raymond T.; and Desai, Jay, 4,886,071, Cl. 128-760.000.
Percarpio, Edward P.; and Plucinski, Andrzej J., 4,886,072, Cl. 128-763.000.

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Bedi, Ram D.: *See*—
Corkin, William R.; and Bedi, Ram D., 4,885,927, Cl. 72-342.000.

Beecham Group p.l.c.: *See*—
King, Francis D., 4,886,808, Cl. 514-299.000.

Beerman, Paul J. Method and device for removing wheel nuts and cap nuts from the outer wheel of a dual-wheel double-nut system. 4,885,834, Cl. 29-426.500.

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Hilfenhaus, Joachim, 4,886,779, Cl. 514-2.000.

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Davis, Kent A.; Bekele, Solomon; and Stockley, Henry W., 4,886,690, Cl. 428-36.600.

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Ben-Dov, Oded, to General Signal Corporation. Process of fabricating a waveguide. 4,885,839, Cl. 29-600.000.

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Bendix France: *See*—
De La Broise, Marc; Tanguy, Christian; and Kervagoret, Gilbert, 4,886,321, Cl. 303-92.000.

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Bennett, Peter G.; McKinlay, Peter R.; Shaw, Neil W.; and Stott, Ronald A., to Amcor Limited. Method of making corrugated paper board. 4,886,563, Cl. 156-205.000.

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Ungarelli, Raffaele; Beretta, Maurizio A.; and Sogli, Loris, 4,886,923, Cl. 570-210.000.

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Berger, Roland: *See*—
Fink, Hans-Ferdi; Berger, Roland; Heilen, Wernfried; and Muss, Peter, 4,886,551, Cl. 106-183.000.
Berges, Hanns-Peter: *See*—
Bachmann, Paul; Berges, Hanns-Peter; and Leier, Wolfgang, 4,886,599, Cl. 210-287.000.
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Noe, Oskar; Noe, Rolf; Noe, Andreas; Dotsch, Willi; and Lux, Herbert, 4,886,199, Cl. 226-118.000.
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Rumbaugh, James T., 4,885,865, Cl. 43-18.500.
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Killian, Edmund F.; and Berliner, Wallace H., 4,886,408, Cl. 411-519.000.
Berndt, Harald. Device for nebuilizing sample liquid for spectroscopical purposes. 4,886,359, Cl. 356-312.000.
Bernhardt, Bruno; Hessner, Anton; and Krug, Rainer, to Ieg Industrie-Engineering GmbH. Method of and arrangement for driving volatile impurities from ground. 4,886,119, Cl. 166-267.000.
Berthold, Werner; Marx, Paul; and Ohlschlager, to Agfa-Gevaert Aktiengesellschaft. Stabilization of a photographically produced silver image. 4,886,737, Cl. 430-372.000.
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Carpentier, Jean-Claude; Michel, Bernard; and Sayers, Kenneth H., 4,886,254, Cl. 267-148.000.
Bertola, Mauro A.; Marx, Arthur F.; Koger, Hein S.; Quax, Wilhelmus J.; Van der Laken, Cornelis J.; Phillips, Gareth T.; Robertson, Brian W.; and Watts, Peter D., to Gist-Brocades N.V.; and Shell Internationale Research Mattschappij B.V. Process for the preparation of a pharmaceutically active compound in a stereospecific form of the formula. 4,886,750, Cl. 435-136.000.
Bertotti, Franco; Ferrari, Paolo; and Gatti, Maria T., to SGS-Thomson Microelectronics s.r.l. Saturation limiting system for a vertical, isolated collector PNP transistor and monolithically integrated structure thereof. 4,887,141, Cl. 357-36.000.
Bertotti, Franco; Cini, Carlo; Contiero, Claudio; and Galbiati, Paola, to SGS Microelettronica S.p.A. Monolithically integrated semiconductor device containing bipolar junction transistors, CMOS and DMOS transistors and low leakage diodes and a method for its fabrication. 4,887,142, Cl. 357-43.000.
Berzofsky, Jay: *See*—
Good, Michael A.; Berzofsky, Jay; and Miller, Louis H., 4,886,782, Cl. 514-12.000.
Bessler, Warren F., to General Electric Company. Side panel assembly for kitchen range. 4,886,042, Cl. 126-21.00R.
Bessyo, Daisuke: *See*—
Matsumoto, Takahiro; Suenaga, Haruo; Maehara, Naoyoshi; Sakamoto, Kazuho; Niwa, Takashi; Bessyo, Daisuke; Kusunoki, Shigeru; and Shitaya, Takao, 4,886,951, Cl. 219-10.55B.
Best, Willie H. Infrared gas grill. 4,886,044, Cl. 126-39.00C.
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Cirkel, Hans-Jurgen; Bette, Willi; and Muller, Reinhard, 4,887,275, Cl. 372-83.000.
Betters, Gordon J. Cable slide guide for compound bows. 4,886,038, Cl. 124-23.00R.
Betterton, Joseph T.; Glover, Alfred H.; McKee, Thomas S.; and Romanczuk, Chris S., to Chrysler Motors Corporation. Stabilized flow control valve. 4,886,033, Cl. 123-574.000.
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Chen, Fu; and Bair, Keith, 4,886,617, Cl. 252-180.000.
Moreland, Robert D., 4,886,575, Cl. 162-5.000.
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Bhatti, Mohinder S., to Owens-Corning Fiberglas Corporation. Feeder for glass fibers and method of producing. 4,886,535, Cl. 65-1.000.
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Brown, Tobias A.; Roos, Scott L.; Biancalana, Donald D.; and Westgaard, Donald J., 4,887,196, Cl. 362-148.000.
Biederstedt, Lutz; and Muller, Manfred, to Krone AG. Communication system thermoprotection device for over voltage suppressor mounted in overvoltage suppressor magazines of communication systems. 4,887,183, Cl. 361-124.000.
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Hossack, James M.; Powers, Jeffry E.; and Billings, John K., 4,887,246, Cl. 367-140.000.
Billman, Timothy B.; and Goodman, Joseph R., to AMP Incorporated. Burn-in socket for gull wing integrated circuit package. 4,886,470, Cl. 439-266.000.
Bioprobe International, Inc.: *See*—
Ngo, That T., 4,886,755, Cl. 435-183.000.
Biscardi, Jeffrey K.: *See*—
Werner, Walter N.; Biscardi, Jeffrey K.; and McClain, Edward L., 4,885,930, Cl. 73-37.000.
Bises, George A.: *See*—
Ratliff, Phillip R.; and Bises, George A., 4,887,231, Cl. 364-564.000.
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Bisping, Hans-Jurgen. Implantable lead assembly with extendable screw-in electrode. 4,886,074, Cl. 128-785.000.
Bitter, Rudolf; and Senff, Gunter, to General Motors Corporation. Engine induction system. 4,886,020, Cl. 123-52.00M.
Bittle, Jerry R.: *See*—
Welch, Gary E.; Appel, Marvin R.; and Bittle, Jerry R., 4,886,354, Cl. 356-70.000.
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Blanchard, Russell O., to Batts, Inc. Size identification system for nesting hangers. 4,886,195, Cl. 223-85.000.
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Blaul, Ronald L., to Trigent, Inc. Method of impact cleaning with solvent spray in an enclosed chamber. 4,886,081, Cl. 134-18.000.
Bletz, Howard W., to Hi-Stat Manufacturing Co., Inc. Thermal sensor assembly. 4,887,062, Cl. 337-299.000.
Blomberg, Ingvar M. Wall mounting device. 4,886,405, Cl. 411-16.000.
Bloom, Stanley; and Hockings, Eric F., to RCA Licensing Corporation. Color display system. 4,887,009, Cl. 315-368.000.
Blount, Inc.: *See*—
Kelsay, Royal E., III; and Hille, Arvin A., 4,885,843, Cl. 30-387.000.
Bluege, John H., to United Technologies. Shared aperture sampler. 4,887,276, Cl. 372-103.000.
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Board of Regents Acting for and on Behalf of University of Michigan: *See*—
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Wang, Wanjun, 4,887,140, Cl. 357-30.000.
Boatwright, Neal: *See*—
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Boden, Richard M.; and McGhie, Joseph A., to International Flavors & Fragrances Inc. S(4-hydroxy-1-isopropyl-4-methylhexyl) thioacetate. 4,886,897, Cl. 558-252.000.
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Boehringer Ingelheim Pharmaceuticals Inc.: *See*—
Grozinger, Karl G.; and Oliver, James T., 4,886,801, Cl. 514-247.000.
Boeing Company, The: *See*—
McCafferty, Hugh A., 4,886,419, Cl. 416-134.00A.
McCowin, Peter D.; and Nelson, Paul E., 4,886,442, Cl. 425-388.000.
Pinson, George T., 4,886,562, Cl. 156-172.000.
Takats, Imre J.; and Aziz, George W., 4,887,214, Cl. 364-424.010.
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Bohler, Erwin; and Bruderer, Werner, to Werkzeugmaschinenfabrik Oerlikon-Buhrle AG. Deflector sprocket for a cartridge feed device in an automatic multi-barrel firing weapon. 4,885,975, Cl. 89-33.250.
Boise Cascade Corporation: *See*—
Sloan, Tod H., 4,886,576, Cl. 162-49.000.
Boland, Bernard W.; Gandy, William E., Jr.; and Jackson, Kevin B, to Motorola Inc. Monolithic temperature compensated voltage-reference diode and method for its manufacture. 4,886,762, Cl. 437-15.000.
Bolton, James C.: *See*—
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Bonczyk, John C., to Chrysler Motors Corporation. Reinforcement for a plastic fuel tank. 4,886,180, Cl. 220-5.00A.
Bonfiglioli, Silverio; Fargnoli, Gianni; and Fato, Massimo, to Weber S.r.l. Idling speed control system for an electronic-injection internal combustion engine. 4,886,025, Cl. 123-339.000.
Bonin, Paul R. Fireplace heat efficiency device. 4,886,047, Cl. 126-552.000.
Bonomi, Christiano: *See*—
Bonomi, Giovanni B.; Giacomini, Luigi; Bonomi, Christiano; Aresa, Carmine; and Frigo, Valerio, 4,885,836, Cl. 29-524.100.
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Bontemps, Raymond. Device designed to preserve cosmetic substances that can be frozen. 4,886,168, Cl. 206-568.000.
Borba, Frank X. Device for sensing malfunction of tying apparatus on hay baler. 4,885,991, Cl. 100-99.000.
Borg-Warner Chemicals, Inc.: *See*—
Parsons, Charles F., 4,886,855, Cl. 525-67.000.
Borger, Koos; and Overeijnder, Hans. Method and apparatus of extruding a plastic pipe under control of the wall thickness of the extruded plastic pipe. 4,886,438, Cl. 425-141.000.
Borrod, Guy; and Lacroix, Guy, to Rhone-Poulenc Agrochimie. Herbicide compositions of N-(phosphonomethylglycyl) sulfonylamines and process for using same. 4,886,542, Cl. 71-087.000.
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Bottelsen, Walter E. Dart with flight lock. 4,886,280, Cl. 273-423.000.
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Bourdon, Jean C., to Schlumberger Technology Corporation. Well drilling operation control procedure. 4,886,129, Cl. 175-40.000.

Bowen, Mark A.: *See*—
Poirier, Victor L.; Dasse, Kurt A.; Bowen, Mark A.; and Daly, Benedict D. T., 4,886,502, Cl. 604-175.000.
Bowles, Dale D.; and Parmley, Charles L. Anti-theft holster. 4,886,197, Cl. 224-243.000.
Bowman, Robert. Hasp fastener unit. 4,886,308, Cl. 292-281.000.
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Davidson, James G.; Allard, Deborah A.; Sawyer, Philip J.; and Boynton, Philip E., 4,886,522, Cl. 44-624.000.
Brastz, James A.; and Kehr, Clifton L., to W. R. Grace & Co.-Conn. Contact lenses based on biocompatible polyurethane and polyurea-urethane hydrated polymers. 4,886,866, Cl. 528-59.000.
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Bragg, Dale E.; Clark, Mark A.; and Fleming, Randy G., to Halliburton Company. Apparatus for adding a selected additive into a mixture. 4,886,367, Cl. 366-132.000.
Brandes, Hal M., to Picturemates Corporation. Picture frame formed from unitary blank. 4,885,854, Cl. 40-152.100.
Brandes, Wilhelm: *See*—
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Braun, Ernest, to SKF Textilmaschinen-Komponenten GmbH. Asynchronous motor for spinning elements. 4,886,991, Cl. 310-212.000.
Braun, Hans: *See*—
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Britt, Paul E., to Vebco, Inc. Motor mounting method and means. 4,886,989, Cl. 310-89.000.
Brittin, Craig E., to General Motors Corporation. Vacuum brazing of aluminum alloy workpieces. 4,886,449, Cl. 432-121.000.
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Brodmann, Peter, to Volkswagen AG. Belt force limiting device. 4,886,296, Cl. 280-805.000.
Brooke, Gerard M. Surgical suction tip with filter. 4,886,492, Cl. 604-49.000.
Brostrom, Gerald M.; Japuntich, Daniel A.; and Yard, Sabrina M., to Minnesota Mining and Manufacturing Company. Filter element. 4,886,058, Cl. 128-206.120.
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Higashiyama, Shunichi, 4,886,773, Cl. 503-201.000.
Kato, Satoshi; and Kanasashi, Hisahito, 4,886,082, Cl. 134-60.000.
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Brown, Herbert C.: *See*—
Goralski, Christian T.; Singaram, Bakthan; and Brown, Herbert C., 4,886,924, Cl. 585-318.000.
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Brown, Robert L. Random number selection device for lotteries and games. 4,886,271, Cl. 273-142.0HA.
Brown, Tobias A.; Roos, Scott L.; Biancalana, Donald D.; and Westgaard, Donald J., to Alkco Manufacturing Company. Recessed track lighting system. 4,887,196, Cl. 362-148.000.
Browne, Alan L., to General Motors Corporation. Vehicle occupant protection system. 4,886,295, Cl. 280-777.000.
Bru-Magniez, Nicole; Teulon, Jean-Marie; and Launay, Michele, to Centre D'Activite Et De Recherches Pharmaceutique Industrielle Biologique Medicale. Novel aminoalkylthio derivatives of triazolopyridine or triazoloquinoline, the processes for their preparation, and drugs, useful especially as analgesics, in which they are present. 4,886,805, Cl. 514-253.000.
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Bugaut, Andree; Junino, Alex; and Cotteret, Jean, to L'Oreal. Dyeing composition for human hair containing an azo dye. 4,886,517, Cl. 8-416.000.
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Burr-Brown Corporation: *See*—
Somerville, Thomas A., 4,887,047, Cl. 330-257.000.
Burton, Gene, Jr., to Atlanta Attachment Company. Thread undercut attachment for a multi-needle sewing machine. 4,886,005, Cl. 112-292.000.
Burwick, Jack L.: *See*—
Penkunas, Joseph J.; Smith, Theodore E.; and Burwick, Jack L., 4,886,638, Cl. 419-15.000.
Burysek, Frantisek; and Andrlik, Pavel, to Vyzkumny ustav bavlnarsky. Device for automatically spinning-in yarn. 4,885,906, Cl. 57-263.000.
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Demny, Albert C.; Harwell, J. Matt; Etheridge, Reggie H.; and Bush, Robert E., 4,886,121, Cl. 166-382.000.
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Wilson, Richard A.; Butler, Jerry F.; Withycombe, Donald A.; Mookherjee, Braja D.; Katz, Ira; and Schrankel, Kenneth R., 4,886,662, Cl. 424-84.000.
C. R. Bard, Inc.: *See*—
Palermo, Thomas J., 4,886,067, Cl. 128-657.000.
Cadmus, Martin C.; and Slodki, Morey E., to United States of America, Agriculture. Heat-stable, salt-tolerant microbial xanthanase. 4,886,746, Cl. 435-42.000.
CAE Machinery Ltd.: *See*—
Bradley, Norman F.; and Chamberlain, Craig H., 4,886,218, Cl. 241-294.000.
Caenazzo, Alessandro; and Pasqualotto, Silvana. Fluid-operated miniature engine. 4,885,978, Cl. 91-232.000.
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Collins, Earl R., Jr., 4,886,065, Cl. 128-642.000.
Hood, Leroy E.; Weissman, Irving L.; and McGrath, Michael S., 4,886,743, Cl. 435-5.000.
Call, Daron L.: *See*—
Digangi, Joseph A.; and Call, Daron L., 4,886,276, Cl. 273-201.000.
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Canada, Her Majesty the Queen in right of: *See*—
Wild, Peter M.; Vickers, Geoffrey W.; Hopkin, David A.; and Moilliet, Antony, 4,886,597, Cl. 210-321.680.
Caney, Steven: *See*—
Schwab, Leonard M.; and Caney, Steven, 4,885,824, Cl. 24-17.00B.
Cannon, Howard I.: *See*—
Holloway, John T.; Moon, David A.; Cannon, Howard I.; Knight, Thomas F.; Edwards, Bruce E.; and Weinreb, Daniel L., 4,887,235, Cl. 364-900.000.
Canon Denshi Kabushiki Kaisha: *See*—
Hoshi, Akio, 4,887,175, Cl. 360-99.080.
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Akiya, Takashi; and Hasegawa, Kenji, 4,887,097, Cl. 346-135.100.
Aoike, Tatsuyuki; Sano, Masafumi; Yoshino, Takehito; Kariya, Toshimitsu; and Niino, Hiroaki, 4,886,723, Cl. 430-65.000.
Asakura, Osamu; Uchikata, Yoshio; Kawazoe, Kenji; Sukigara, Akihiko; Shibamiya, Yoshikazu; and Mizoguchi, Shigeru, 4,887,096, Cl. 346-76.0PH.
Gofuku, Ihachiro; Osada, Yoshiyuki; and Nakagawa, Katsumi, 4,886,962, Cl. 250-211.00J.
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Handa, Yuichi; Okuda, Masahiro; and Osawa, Hiroshi, 4,887,255, Cl. 369-112.000.
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Hoshi, Hiroaki; and Kitagishi, Kozomu, 4,886,959, Cl. 250-201.000.
Imai, Nobuhiro; and Asano, Fumio, 4,887,103, Cl. 346-160.100.
Ina, Hideki, 4,886,974, Cl. 250-561.000.
Kinoshita, Masahide; Tajima, Hatsuo; Hoshika, Norihisa; Tajika, Hiroshi; and Hosoi, Atsushi, 4,887,131, Cl. 355-253.000.
Kinoshita, Takao; and Tojo, Akihiko, 4,887,160, Cl. 358-213.260.
Kobayashi, Ryuichi, 4,887,117, Cl. 354-400.000.
Maeshima, Katsuyoshi, 4,887,163, Cl. 358-443.000.
Miyawaki, Mamoru, 4,886,587, Cl. 204-130.000.
Mori, Shigeki; Kobayashi, Katsuyuki; Taniishi, Shinnosuke; and Yamamoto, Kousuke, 4,887,245, Cl. 367-129.000.
Murakami, Eiichi; Kohno, Michio; and Suzuki, Akiyoshi, 4,886,975, Cl. 250-572.000.
Okano, Tatsuo; and Hisada, Katsutoshi, 4,887,224, Cl. 364-518.000.
Saito, Keishi; and Fujioka, Yasushi, 4,887,134, Cl. 357-16.000.
Suzuki, Noriyuki; Tanaka, Atsushi; Kaneko, Kiyoshi; Yoshimura, Yuichiro; Taniishi, Shinnosuke; Kobayashi, Katsuyuki; and Mori, Shigeki, 4,886,943, Cl. 178-18.000.
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Takahashi, Masamoto, 4,887,164, Cl. 358-443.000.
Tanaka, Katsuhiko; and Fukumoto, Hiroshi, 4,886,725, Cl. 430-106.600.

Terai, Haruhiko; and Watanabe, Yasutomo, 4,887,099, Cl. 346-140.00R.
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Yamada, Yasuaki, 4,887,082, Cl. 341-26.000.
Yoshikawa, Masao; and Kobayashi, Tatuya, 4,887,102, Cl. 346-157.000.

Cantrell, Gary L., to Mallinckrodt, Inc. Process for preparing aromatic fluorides. 4,886,920, Cl. 570-141.000.

Cappotto, Samuel D., to Smith Corona Corporation. Ribbon tensioning mechanism. 4,886,385, Cl. 400-234.000.

Caprette, Samuel J., Jr.: *See*—
Black, Robert H.; and Caprette, Samuel J., Jr., 4,887,247, Cl. 367-151.000.

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Feller, Roger K.; Warner, Samuel R.; and Capriotti, Janice D., 4,885,935, Cl. 73-117.200.

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Wooding, Michael J.; Cardema, Rudolfo S.; and Ramiller, Charles L., 4,886,412, Cl. 414-416.000.

Carden, Matthew J.; Lantz, Kim; Reh, Theresa L.; Trytten, Anne; and Lubino, Yves, to Hewlett-Packard Company. X.25 Wide area network channel status display. 4,887,260, Cl. 370-60.000.

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Kuehne, Norbert; Raehse, Wilfried; and Carduck, Franz-Josef, 4,886,602, Cl. 210-637.000.

Carevic, Olga: *See*—
Djokic, Slobodan; Lopotar, Nevenka; Kobrehel, Gabrijela; Krnjevic, Hrvoje; and Carevic, Olga, 4,886,792, Cl. 514-183.000.

Caribonum Ltd.: *See*—
Paffhausen, Hans; Hogarth, Ian; Scott, Andrew; and Mackintosh, Christine, 4,886,386, Cl. 400-241.400.

Carl Freudenberg, Firma: *See*—
Ehrmann, Peter; Spies, Karl-Heinz; and Vogt, Rolf, 4,886,281, Cl. 277-47.000.
Fottinger, Walter; Hauber, Michael; and Weghmann, Arnold, 4,886,527, Cl. 55-156.000.

Carn, Ronald C.: *See*—
Kent, Allan R.; Read, Harold A.; Henry, Barry A.; Kaczor, Charles E.; Mills, Milton V.; Carn, Ronald C.; Metz, Donald R.; Zagame, Steven P.; and Kirk, Robert C., 4,887,076, Cl. 340-825.160.

Carner, Barbara A. Fishing lure using infrared attracting means. 4,885,864, Cl. 43-17.500.

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Carpenter, Gene: *See*—
Kress, Edward S.; and Carpenter, Gene, 4,886,580, Cl. 202-228.000.

Carpenter Technology Corporation: *See*—
Garner, Harrison A., Jr.; Hemphill, Raymond M.; McGraw, John F.; Schmidt, Michael L.; Smith, Bruce A.; and Wert, David E., 4,886,640, Cl. 420-111.000.

Carpentier, Jean-Claude; Michel, Bernard; and Sayers, Kenneth H., to Bertin & Cie. Elastic suspension blade provided with end connectors for a vehicle. 4,886,254, Cl. 267-148.000.

Carrier Corporation: *See*—
McManus, John R., 4,885,840, Cl. 29-611.000.

Carriere, Ron: *See*—
Lindner, Charles E., 4,885,812, Cl. 5-113.000.

Carroll, Edward J.; and Walker, Nigel, to Plessey Overseas Limited. Optical FSK demodulator. 4,887,314, Cl. 455-619.000.

Carroll, James R.; McGinnis, Leon W.; Miller, Terry L.; and Norris, Michael B., to Rogers Corporation. Glass fiber reinforced fluoropolymeric circuit laminate. 4,886,699, Cl. 428-228.000.

Carson, Forrest L.; and Johnson, Kenneth M., to J. M. Huber Corporation. Coupling with improved elastomeric face seal. 4,886,303, Cl. 285-99.000.

Carter, Daniel C.; and Smith, Robbie E., to United States of America, National Aeronautics and Space Administration. Hanging drop crystal growth apparatus and method. 4,886,646, Cl. 422-245.000.

Cartwright, Richard V., to Hercules Incorporated. Ignition modifying overcoat for deterrent-coated smokeless propellant. 4,886,560, Cl. 149-12.000.

CasChem, Inc.: *See*—
Chu, Yuan C.; and Brauer, Melvin, 4,886,600, Cl. 210-321.800.

Cash, Glenn L.; Hatamian, Mehdi; and Ligtenberg, Adrianus, to American Telephone and Telegraph Company, AT&T Bell Laboratories. Pipeline arithmetic adder and multiplier. 4,887,233, Cl. 364-757.000.

Casio Computer Co., Ltd.: *See*—
Yoshida, Junichi; Sugano, Shinichi; and Koike, Masaaki, 4,887,188, Cl. 361-413.000.

Cassia, Antonio M., to Steiner Company, Inc. Liquid soap dispenser. 4,886,192, Cl. 222-181.000.

Castan, Joseph, to Societe Industrielle de l'Anhydride Carbonique. Process for apparatus for cryogenic cooling using liquid carbon dioxide as a refrigerating agent. 4,886,534, Cl. 62-35.000.

Castillo, Edward L.; Castillo, James D.; and Castillo, Michael S., to Innovation Sports, Inc. Knee brace with cammed stop lever. 4,886,054, Cl. 128-80.00F.

Castillo, James D.: *See*—
Castillo, Edward L.; Castillo, James D.; and Castillo, Michael S., 4,886,054, Cl. 128-80.00F.

Castillo, Michael S.: *See*—
Castillo, Edward L.; Castillo, James D.; and Castillo, Michael S., 4,886,054, Cl. 128-80.00F.

Castro, Bertrand; and Fehrentz, Jean, to Sanofi. Process for synthesis of alpha aklyl amino aldehydes. 4,886,914, Cl. 564-343.000.

Catch, John B., to Engineering Measurments Company. Protected flow meter rotor bearing. 4,886,420, Cl. 416-174.000.

Cauzin Systems, Incorporated: *See*—
Glaberson, John; and Santulli, Scott, 4,886,957, Cl. 235-482.000.

Centre D'Activite Et De Recherches Pharmaceutique Industrielle Biologique Medicale: *See*—
Bru-Magniez, Nicole; Teulon, Jean-Marie; and Launay, Michele, 4,886,805, Cl. 514-253.000.

Centre International De Recherches Dermatologiques C.I.R.D.: *See*—
Shroot, Braham; Eustache, Jacques; and Bouclier, Martine, 4,886,907, Cl. 562-490.000.

Centre National de la Recherch Scientifique: *See*—
Sabban, Joseph C.; Rodier, Jean-Claude; Roussel, Andre ; and Simon, Jacques F., 4,886,351, Cl. 351-221.000.

Centre National De La Recherche Scientifique: *See*—
Menet, Jacques; and de Gabrielli, Olivier, 4,886,992, Cl. 313-153.000.

Ceskoslovenska Akademie ved: *See*—
Wichterle, Otto, 4,886,350, Cl. 351-160.00H.

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Romagnoli, Andrea, 4,885,896, Cl. 53-116.000.

Cetlin, Norman, to GAC International, Inc. Orthodontic appliances for dental arch expansion. 4,886,451, Cl. 433-7.000.

Chadwick, Geoffrey A. Magnesium alloy. 4,886,557, Cl. 148-3.000.

Chamberlain, Craig H.: *See*—
Bradley, Norman F.; and Chamberlain, Craig H., 4,886,218, Cl. 241-294.000.

Chamberlain Group, Inc., The: *See*—
Chang, James S.; and Clark, Scott M., 4,885,872, Cl. 49-362.000.

Chambers, Michael K.: *See*—
Sage, Ian C.; Chambers, Michael K.; Hittich, Reinhard; and Weber, Georg, 4,886,621, Cl. 252-299.610.

Chamourian, Arto, to Hamelin Group Inc. Plastic container lid. 4,886,184, Cl. 220-306.000.

Chan, Dominic M.; El-Sayed, Lyla M.; Thanawalla, Chandrakant B.; and Trout, Torence J., to Du Pont de Nemours, E. I., and Company. Glycerides as charge directors for liquid electrostatic developers. 4,886,726, Cl. 430-115.000.

Chan, Ting Y.; and Colvert, James H., to Texaco Inc. Liquid degaser in an ebullated bed process. 4,886,644, Cl. 422-140.000.

Chancellor, Masters and Scholars of the University of Oxford, The: *See*—
Southern, Edwin, 4,886,589, Cl. 204-182.800.

Chang, James S.; and Clark, Scott M., to Chamberlain Group, Inc., The. Garage door operator with plastic drive belt. 4,885,872, Cl. 49-362.000.

Chang, Robert C. W.; Vorndran, Steven C.; and Joseph, Michael F., to Westinghouse Electric Corp. Method and apparatus for plasma pyrolysis of liquid waste. 4,886,001, Cl. 110-346.000.

Chang, San-Julie. Power source circuit device for monitors and host computers. 4,886,979, Cl. 307-11.000.

Chaplin, Daniel J., to Grass Valley Group Inc., The. Shadow visual effects wipe generator. 4,887,159, Cl. 358-183.000.

Charbonneau, Duane L.; Moore, Debra J.; and Shulman, Joel I., to Procter & Gamble Company, The. Oral treatment method for reducing plaque with reduced staining. 4,886,658, Cl. 424-53.000.

Charles Greiner and Company, Inc.: *See*—
Calabrese, Anthony, 4,886,052, Cl. 128-75.000.

Chaudhuri, Ratan K.; Tracy, David J.; and Login, Robert B., to GAF Corporation. Diquarternary nitrogen compounds. 4,886,890, Cl. 548-519.000.

Chen, Bibiana S. Y.; and Henton, David E., to Dow Chemical Company, The. Functionalized elastomers blended with polar copolymers of styrene and acrylic acid methacrylic acid or maleic anhydride. 4,886,856, Cl. 525-73.000.

Chen, Chen-Tsung. Toy Xylophone. 4,885,972, Cl. 84-403.000.

Chen, Fu; and Bair, Keith, to Betz Laboratories, Inc. Water soluble phosphonated polymers. 4,886,617, Cl. 252-180.000.

Chen, Min-Liang; Leung, Chung W.; Lu, Chih-Yuan; and Tsai, Nun-Sian, to American Telephone and Telegraph Company, AT&T Bell Laboratories. Method of making silicides by heating in oxygen to remove contamination. 4,886,765, Cl. 437-200.000.

Chen, Tsai A. Continuous processing baking machines. 4,886,041, Cl. 126-19.00R.

Cheney, Glen T.; Kirsch, Howard C.; Nelson, James T.; and Stefany, James H., to American Telephone and Telegraph Company, AT&T Bell Laboratories. Dual level polysilicon single transistor-capacitor memory array. 4,887,135, Cl. 357-23.600.

Cheng, Hsien C.: *See*—
Jones, Winton D.; Claxton, George P.; Dage, Richard C.; Cheng, Hsien C.; and Robinson, Phillip J., 4,886,811, Cl. 514-314.000.

Cheng, Kuang L., to Solar Scientific, Inc. Potential measuring method and apparatus having signal amplifying multiple membrane electrode. 4,886,584, Cl. 204-1.00T.

Cherbonnier, T. Dave. Dynamic load compensating system. 4,886,397, Cl. 405-195.000.

Cherry Semiconductor Corporation: *See*—
Gontowski, Walter S., 4,887,022, Cl. 323-284.000.

Cherubini, Jack: *See*—
Krause, Alan E., II; and Willett, Russell G., 4,886,287, Cl. 280-246.000.

Chesters, Thomas P. Graphic music system. 4,885,969, Cl. 84-1.010.

Chiang, George C.; and Toji, Masuo, to Du Pont de Nemours, E. I., and Company. Preparation of 2-amino triazines. 4,886,881, Cl. 544-194.000.

Chiba, Kazuhiro; and Bamba, Noriko, to Mitsubishi Denki Kabushiki Kaisha. Device for converting video image signals to printing data signals. 4,887,150, Cl. 358-80.000.

Chiba, Mitsuo: *See*—
Bannai, Tatsushi; Awamoto, Shigeru; Chiba, Mitsuo; and Sasaki, Seishi, 4,887,169, Cl. 358-335.000.

Chiku, Kazuyoshi: *See*—
Hirose, Yoshihiko; Aoki, Tomohiro; Chiku, Kazuyoshi; Murayama, Yasushi; Uchida, Takashi; and Matsuzawa, Kunihiko, 4,887,101, Cl. 346-134.000.

Chilton, Scott W.: *See*—
Sederoff, Ronald R.; Stomp, Anne-Marie; Moore, Larry W.; and Chilton, Scott W., 4,886,937, Cl. 800-1.000.

Chiodo, Chris, to Activational Systems, Inc. Micropipettes and fabrication thereof. 4,885,945, Cl. 73-863.320.

Chisso Corporation: *See*—
Miyazawa, Kazutoshi; Inukai, Takashi; Inoue, Hiromichi; Saito, Shinichi; and Ohno, Kouji, 4,886,622, Cl. 252-299.610.

Chiu, Chung-Wai; and Zallie, James P., to National Starch and Chemical Corporation. Method for manufacture of jelly gum confections. 4,886,678, Cl. 426-578.000.

Chiyoshi, Toyoharu: *See*—
Sugiura, Takashi; Matsuura, Ichiro; Miyauchi, Fumio; and Chiyoshi, Toyoharu, 4,886,630, Cl. 264-46.600.

Cho, Jim. DTMF-Code controlled lock device. 4,887,078, Cl. 340-825.480.

Cholet, Henri; and Bardin, Christian, to Institut Francais du Petrole. Inclined-jet drilling tool. 4,886,131, Cl. 175-340.000.

Chou, Tom M. Gate control system. 4,887,205, Cl. 364-400.000.

Christ, Wilhelm: *See*—
von der Eltz, Hans-Ulrich; and Christ, Wilhelm, 4,885,814, Cl. 8-149.100.

Christensen, Mogens A., to A/S Niro Atomizer. Fluid bed dryer and a bed plate therefor. 4,885,848, Cl. 34-57.00R.

Christian, Donald J., to Texas Instruments Incorporated. Visual navigation system for a mobile robot having capabilities of regenerating of hidden images. 4,887,223, Cl. 364-518.000.

Christopher, Hans-Gunther; Thurk, Joachim; Noack, Dieter; and Schultz, Thomas, to Siemens Aktiengesellschaft. Pressure or draw bar of fiber-reinforced insulating material. 4,886,944, Cl. 200-48.00R.

Chrysler Motors Corporation: *See*—
Asmus, Thomas W., 4,886,032, Cl. 123-559.000.
Betterton, Joseph T.; Glover, Alfred H.; McKee, Thomas S.; and Romanczuk, Chris S., 4,886,033, Cl. 123-574.000.
Bonczyk, John C., 4,886,180, Cl. 220-5.00A.
Fedelem, William E.; and Hutter, Robert B., 4,886,182, Cl. 220-85.00F.
Peveto, Johnnie E., 4,886,467, Cl. 439-192.000.

Chu, Mosi, to Primages, Inc. Piezoelectric controlled electromagnetically driven printing. 4,886,380, Cl. 400-121.000.

Chu, Yuan C.; and Brauer, Melvin, to CasChem, Inc. Moisture and glycerine resistant polyurethane compositions for separatory devices. 4,886,600, Cl. 210-321.800.

Chuan, Chang C. Structure of a container and closure. 4,886,185, Cl. 220-307.000.

Chun, Joong H. Computer aided custom tailoring with disposable measurement clothing. 4,885,844, Cl. 33-15.000.

Ciba-Geigy Corporation: *See*—
Aebli, Beat M.; and Gremmelmaier, Claude, 4,886,887, Cl. 548-490.000.
Hahn, Holger; and Blattner, Rudolf, 4,886,880, Cl. 544-76.000.
Lang, Robert W.; and Klingert, Bernd, 4,886,879, Cl. 540-486.000.
Ruess, Wilhelm; Urech, Pierre; Eberle, Jurg; and Staub, Theodor, 4,886,824, Cl. 514-383.000.
Ruess, Wilhelm; Urech, Pierre; Eberle, Jurg; and Staub, Theodor, 4,886,825, Cl. 514-383.000.
Sire, Jean-Marie, 4,886,518, Cl. 8-566.000.
Wirth, Hermann O.; and Friedrich, Hans-Helmut, 4,886,610, Cl. 252-32.500.

Ciga-Geigy Corporation: *See*—
Koci, Zdenek, 4,886,549, Cl. 106-19.000.

Cineonix, Inc.: *See*—
Jones, John A.; Marchus, L. Mark; and Hardy, Loren S., 4,886,230, Cl. 248-170.000.

Cini, Carlo: *See*—
Bertotti, Franco; Cini, Carlo; Contiero, Claudio; and Galbiati, Paola, 4,887,142, Cl. 357-43.000.

Cipriano, Robert A.: *See*—
McCullough, Francis P., Jr.; Cipriano, Robert A.; and Snelgrove, R. Vernon, 4,886,715, Cl. 429-103.000.

Cirelli, Giorgio; Steffen, Hans; and Surber, Christian, to Hoffmann-La Roche Inc. Portable injection appliance. 4,886,499, Cl. 604-131.000.

Cirkel, Hans-Jurgen; Bette, Willi; and Muller, Reinhard, to Kraftwerk Union Aktiengesellschaft. High-energy laser system. 4,887,275, Cl. 372-83.000.

Claar, Klaus: *See*—
Robitschko, Peter; Claar, Klaus; Deischl, Hans; and Schumacher, Josef, 4,887,065, Cl. 340-430.000.

Clabes, Joachim G.; Hahn, Peter O.; Ho, Paul S.; Lefakis, Haralambos; and Rubloff, Gary W., to International Business Machines Corporation. Metal-polymer adhesion by low energy bombardment. 4,886,681, Cl. 427-38.000.

Clamshell Partners Ltd.: *See*—
Hunt, Rowland D.; and Gardner, Kenneth, 4,885,877, Cl. 52-2.000.

Clark, James W.; and De Pugh, Chauncey C., to Scott Paper Company. Adhesive material for creping of fibrous webs. 4,886,579, Cl. 162-111.000.

Clark, Mark A.: *See*—
Bragg, Dale E.; Clark, Mark A.; and Fleming, Randy G., 4,886,367, Cl. 366-132.000.

Clark, Robin D., to Syntex (U.S.A.) Inc. Optical isomers of sulfonyldecahydro-8H-isoquino-(2,1-G)(1,6) naphthyridines and related compounds useful as α_2-blockers. 4,886,798, Cl. 514-233.200.

Clark, Scott M.: *See*—
Chang, James S.; and Clark, Scott M., 4,885,872, Cl. 49-362.000.

Clausen, Thomas: *See*—
Konrad, Eugen; and Clausen, Thomas, 4,886,516, Cl. 8-408.000.

Claxton, George P.: *See*—
Jones, Winton D.; Claxton, George P.; Dage, Richard C.; Cheng, Hsien C.; and Robinson, Phillip J., 4,886,811, Cl. 514-314.000.

Claydon, Paul C.; and Ball, Martin F., to Metal Box p.l.c. Method of forming containers. 4,885,924, Cl. 72-109.000.

Clearwater, Walter A., to Micro Control Technology Limited. Method of displaying detected information about a rotating mass. 4,887,087, Cl. 342-61.000.

Clegg, Robert D.: *See*—
Arvidson, Russell A.; Renick, James T.; Clegg, Robert D.; and Zimmer, Lawrence E., 4,886,504, Cl. 604-257.000.

Clemence, Francois: *See*—
Aktogu, Nurgun; and Clemence, Francois, 4,886,802, Cl. 514-250.000.

Clemens, David H.; Hurwitz, Marvin J.; and Walker, Robert W., to Rohm and Haas Company. Method of purifying condensate waters for steam regenerating equipment. 4,886,606, Cl. 210-684.000.

Cleveland Machine Controls, Inc.: *See*—
Griebeler, Elmer L., 4,887,248, Cl. 367-181.000.

Clifford Electronics, Inc.: *See*—
Drori, Ze'ev; and Amirpoor, Manssor M., 4,887,064, Cl. 340-426.000.

Climent, Jean-Pierre; and Tronel, Jean-Claude, to Commissariat a l'Energie Atomique. Device for protecting electronic equipment against strong electromagnetic pulses, more particulary due to lightening. 4,887,180, Cl. 361-91.000.

Cloutier, Daniel R.: *See*—
Davis, James K.; Althen, Wayne W.; Cloutier, Daniel R.; and Schnitzler, Gerry R., 4,887,221, Cl. 364-474.230.

Clover Co., Ltd.: *See*—
Nakai, Hatsuo, 4,885,923, Cl. 70-284.000.

Clubb, Clyde N.: *See*—
Foster, Bruce W.; Clubb, Clyde N.; and Stuart, Richard K., Jr., 4,886,853, Cl. 524-477.000.

Cobben, Johannes I. M., to U.S. Philips Corporation. Mobile x-ray apparatus comprising exchangeable wheels. 4,887,287, Cl. 378-198.000.

Coca-Cola Company, The: *See*—
Hoover, George H., 4,886,525, Cl. 55-55.000.
Kirschner, Jonathan; Smazik, Kenneth G.; and Paisley, Gary V., 4,886,190, Cl. 222-57.000.

Coe, Thomas U., to Furukawa Aluminum Co., Ltd.; Kawasaki Steel Corp.; and Itoh & Co., Ltd. Substrate for rigid disk storage media and method and apparatus for making the same. 4,887,179, Cl. 360-135.000.

Cohen, Amir, to Agroteam Consultants Ltd. 2; and Plastro-Gvat. Rotary sprinklers. 4,886,211, Cl. 239-222.170.

Colato, Albert E.: *See*—
Pomroy, James F.; and Colato, Albert E., 4,886,948, Cl. 219-10.55F.

Cole-Parmer Instrument Company: *See*—
Soderquist, Charles E.; and Beck, James P., 4,886,431, Cl. 417-477.000.

Cole, Rodney D. Cosmetic container and assembly. 4,886,080, Cl. 132-320.000.

Coleman, Lawrence B., to Continental Machines, Inc. Anti-shock directional control fluid valve. 4,886,091, Cl. 137-625.650.

Colgate-Palmolive Company: *See*—
Dehan, Louis, 4,886,615, Cl. 252-90.000.
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Davis, Hedley; and Raible, Robert, 4,886,941, Cl. 178-18.000.

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Kiman, Frank R., 4,886,939, Cl. 174-77.00R.

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Shupe, Russell D., 4,886,120, Cl. 166-274.000.
Welch, Gary E.; Appel, Marvin R.; and Bittle, Jerry R., 4,886,354, Cl. 356-70.000.

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Contiero, Claudio: *See*—
Bertotti, Franco; Cini, Carlo; Contiero, Claudio; and Galbiati, Paola, 4,887,142, Cl. 357-43.000.
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Coleman, Lawrence B., 4,886,091, Cl. 137-625.650.
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Cope, Richard P.; and Fisher, Leo, to Crest-Foam Corporation. Conductive polyurethane foam compositions containing tetralyanoethylene and method. 4,886,626, Cl. 252-500.000.
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Helmstetter, John G., 4,886,548, Cl. 106-18.120.
Corella, Arthur P. Self-supporting, flexible, dispensing package. 4,886,373, Cl. 383-104.000.
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Mauchan, Donald E.; and Corrigan, Alfred E., 4,886,732, Cl. 430-210.000.
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Kleschick, William A.; Ehr, Robert J.; Costales, Mark J.; Gerwick, Ben C., III; Meikle, Richard W., deceased; Monte, William T.; and Pearson, Norman R., 4,886,883, Cl. 544-263.000.
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Anderle, Friedrich; Costescu, Dan L.; Kempf, Stefan; Novak, Emmerich; and Zejda, Jaroslav, 4,886,592, Cl. 204-298.000.
Cotteret, Jean: *See*—
Bugaut, Andree; Junino, Alex; and Cotteret, Jean, 4,886,517, Cl. 8-416.000.
Coulter Corporation: *See*—
Kortright, Kenneth H.; Hofheinz, David E.; Forman, Meryl A.; Lee, Song Y.; Smariga, Paulette E.; and Stoner, Candie S., 4,886,742, Cl. 435-5.000.
Courrege, Claude, to Stepack. Gas burner of the cold nozzle type. 4,886,446, Cl. 431-329.000.
Cowger, Bruce: *See*—
Heffernan, Mary B.; Norton, Kenneth A.; and Cowger, Bruce, 4,885,932, Cl. 73-53.000.
Creanova AG.: *See*—
Wassilieff, Victor, 4,886,193, Cl. 222-446.000.
Creps, Wendell D.: *See*—
Orrell, William B.; and Creps, Wendell D., 4,886,027, Cl. 123-478.000.
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Cope, Richard P.; and Fisher, Leo, 4,886,626, Cl. 252-500.000.
Crews, Beverly J. Reusable therapeutic device. 4,886,063, Cl. 128-403.000.
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Hunt, Robert J.; and Crockard, Kenneth F., 4,885,904, Cl. 57-67.000.
Crum, Stephen T.: *See*—
Unser, Bobby; and Crum, Stephen T., 4,887,086, Cl. 342-20.000.
Cryer, John. Method of combating dutch elm disease. 4,886,671, Cl. 424-641.000.
Cuellar, Richard E.: *See*—
Larkins, Brian; Cuellar, Richard E.; Wallace, John C.; and Galili, Gad, 4,886,878, Cl. 536-26.000.
Cuffiani, Illaro; Fabbri, Roberto; Margelli, Gian F.; and Zucchini, Umberto, to Ausimont. Catalysts for the preparation of elastomeric olefinic copolymers. 4,886,770, Cl. 502-104.000.
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Sweetland, Roger D.; and Hager, Francis M., 4,885,953, Cl. 74-606.00R.
Cummins, Kenneth L.; Hecox, Kurt E.; and Williamson, Malcolm J., to Nicolet Instrument Corporation. Adaptive, programmable signal processing hearing aid. 4,887,299, Cl. 381-68.400.
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Spiering, Michael W.; and Cunningham, Michael T., 4,886,300, Cl. 285-26.000.
Curfman, Paul D., to Union Carbide Corporation. Electrolytic method of and bath for stripping coating from aluminum bases. 4,886,588, Cl. 204-146.000.
Cyprien Guy; Fisch, Alain; Haggiage, Johnny; Porte, Hugues; Prazuck, Thierry; and Torres, Ghislaine, to Rhone-Poulenc Chimie. Diorganopolysiloxane dosage forms for the controlled release of iodine values. 4,886,661, Cl. 424-78.000.
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Czaja, Julius. Open cycle latent heat engine. 4,885,913, Cl. 60-673.000.
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Fondeur, Bernard, 4,886,353, Cl. 356-4.500.
D. H. Technology, Inc.: *See*—
Kersey, Kevin T., 4,886,381, Cl. 400-124.000.
D-K Gleason, Inc.: *See*—
Stritzel, Gene A., 4,885,958, Cl. 74-715.000.
Dadgar, Ahmad: *See*—
Shin, Charles C.; Favstritsky, Nicolai A.; and Dadgar, Ahmad, 4,886,543, Cl. 71-88.000.
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Jones, Winton D.; Claxton, George P.; Dage, Richard C.; Cheng, Hsien C.; and Robinson, Phillip J., 4,886,811, Cl. 514-314.000.
Dahl, Helmut: *See*—
Skuballa, Werner; Vorbrueggen, Helmut; Dahl, Helmut; Stuerzebecher, Claus-Steffen; and Thierauch, Karl-Heinz, 4,886,788, Cl. 514-58.000.
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Yagihara, Hiroshi; Goto, Yukihisa; Masamoto, Kazuhisa; Morishima, Yasuo; and Osabe, Hirokazu, 4,886,546, Cl. 71-88.000.
Daigle, Ronald E.: *See*—
Hwang, Juin-Jet; Hurt, William A.; and Daigle, Ronald E., 4,887,306, Cl. 382-54.000.
Daikin Industries Ltd.: *See*—
Ohsaka, Yohnosuke; Takaki, Shoji; and Sakai, Hiroo, 4,886,581, Cl. 203-80.000.
Daimler Benz AG: *See*—
Leiber, Heinz; Ohnemuller, Hans-Joachim; and Kastner, Klaus, 4,886,140, Cl. 180-197.000.
Lutze, Norbert, 4,886,531, Cl. 55-244.000.
Robitschko, Peter; Claar, Klaus; Deischl, Hans; and Schumacher, Josef, 4,887,065, Cl. 340-430.000.
Weiler, Werner; and Patzelt, Helmut, 4,886,293, Cl. 280-736.000.
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Gutfleisch, Siegfried; Hopsch, Gerhard; and Kleinschmit, Einhard, 4,886,481, Cl. 464-162.000.
Haussermann, Gerd, 4,886,251, Cl. 267-140.100.
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Nisi, Dieter; and Paul, Helmut, 4,886,105, Cl. 164-16.000.
Resch, Reinhard, 4,885,910, Cl. 60-562.000.
Scheurenbrand, Dieter; and Wawra, Helmut, 4,886,031, Cl. 123-516.000.
Trube, Hans; Korber, Jurgen; and Duenas, Santiago, 4,886,311, Cl. 296-37.120.
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Dainippon Ink and Chemicals, Inc.: *See*—
Kawamura, Masahide; Sakakibara, Masaki; Watanabe, Teruo; Obauashi, Akira; Hiraoka, Nobutsugu; and Kita, Keiko, 4,886,756, Cl. 435-199.000.
Kuwamura, Shinichi; and Ooka, Masataka, 4,886,862, Cl. 526-247.000.
Dainippon Pharmaceutical Co., Ltd.: *See*—
Matsumoto, Jun-ichi; Miyamoto, Teruyuki; Egawa, Hiroshi; and Nakamura, Shinichi, 4,886,810, Cl. 514-312.000.
Dalgety U.K. Limited: *See*—
Baines, David A.; Filby, Paul K.; and Kierstan, Marek P. J., 4,886,659, Cl. 424-63.000.
Dallavia, Anthony J., Jr.; Vande Ven, Susan; and Smith, Bobby E., to J. M. Huber Corporation. Mineral filler fire retardant compositoin and method. 4,886,839, Cl. 521-124.000.
Daly, Benedict D. T.: *See*—
Poirier, Victor L.; Dasse, Kurt A.; Bowen, Mark A.; and Daly, Benedict D. T., 4,886,502, Cl. 604-175.000.
D'Amato, Ralph J.; Godfrey, Richard H.; Morrell, Albert M.; and Ragland, Frank R., Jr., to RCA Licensing Corporation. Cathode-ray tube having faceplate panel with essentially planar screen periphery. 4,887,001, Cl. 313-461.000.
Damico, Joyce A.; and Weber, Rebecca J., to Kimberly-Clark Corporation. Incontinent garment with elasticized pouch. 4,886,512, Cl. 609-385.200.
D'Amore, Patricia; Leong, Kam W.; and Langer, Robert S., to Massachusetts Institute of Technology. Bioerodible articles useful as implants and prostheses having predictable degradation rates. 4,886,870, Cl. 528-206.000.
Dana Corporation: *See*—
Fett, Gregory A., 4,885,831, Cl. 29-159.200.
Danippon Screen Mfg. Co., Ltd.: *See*—
Yao, Koji, 4,887,225, Cl. 364-518.000.
Danna, Dominick: *See*—
Wawro, Thaddeus J.; English, Stanley R.; and Danna, Dominick, 4,887,154, Cl. 358-98.000.
Dannatt, Hugh S., to Pitney Bowes Inc. Cutter module for a modular mailing machine. 4,886,132, Cl. 177-4.000.

Dannhaeuser, Friedrich, to Siemens Aktiengesellschaft. Method and apparatus for transmission of optical data between two electrically separated transmitting receiving units. 4,887,312, Cl. 455-607.000.

Danson, David P., to Wind Feather, United Science Asc. Wind turbine air foil. 4,886,421, Cl. 416-236.00R.

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Raagaard, Jacob; and Nielsen, Claus J., 4,886,337, Cl. 350-96.200.

Danutec Werkstoff Gesellschaft m.b.H.: *See*—
Schnell, Peter; Maier-Lehner, Franz; and Spaun, Rudiger;, 4,886,684, Cl. 427-370.000.

Darras, Robert L. Medical instrument cover. 4,886,049, Cl. 128-4.000.

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Moore, James A.; Dasheff, Andrew N.; and Kaufman, Frank B., 4,886,734, Cl. 430-270.000.

Dasse, Kurt A.: *See*—
Poirier, Victor L.; Dasse, Kurt A.; Bowen, Mark A.; and Daly, Benedict D. T., 4,886,502, Cl. 604-175.000.

Davidson, James G.; Allard, Deborah A.; Sawyer, Philip J.; and Boynton, Philip E., to Malin Research Corporation. Process, for the desulfurization of coal. 4,886,522, Cl. 44-624.000.

Davies, Stephen H., to Lucas Industries, public limited company. Coupling for a linear displacement transducer. 4,886,154, Cl. 192-141.000.

Davis, Cecil J.; Matthews, Robert T.; Loewenstein, Lee M.; Jucha, Rhett B.; Hildenbrand, Randall C.; and Jones, John I., to Texas Instruments Incorporated. Processing apparatus and method. 4,886,570, Cl. 156-643.000.

Davis, Edward H.; Klaes, Gerald F.; Harris, Jack L.; and Douglass, Paul L., to Gates Rubber Company, The. Crimping apparatus. 4,885,928, Cl. 72-410.000.

Davis, Hedley; and Raible, Robert, to Commodore Business Machines, Inc. Circuit for interfacing mouse input device to computer system. 4,886,941, Cl. 178-18.000.

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Rush, Hughey A.; Hibbard, Billy B.; Pursoo, Johnson L.; Lindsay, John W.; Smith, Thomas E.; Harper, Kenneth; Tullos, MIchael V.; and Davis, James E., 4,886,706, Cl. 428-288.000.

Davis, James K.; Althen, Wayne W.; Cloutier, Daniel R.; and Schnitzler, Gerry R., to Sunnen Products Company. Computer controlled honing machine using look up table data for automatic programming. 4,887,221, Cl. 364-474.230.

Davis, James R.; and Wilson, Robert T., to Fisher Controls International, Inc. Valve stem packing containment for high pressure, high temperature. 4,886,241, Cl. 251-214.000.

Davis, John M. Apparatus for molding footwear. 4,886,238, Cl. 249-83.000.

Davis, Kent A.; Bekele, Solomon; and Stockley, Henry W., to W. R. Grace & Co. Peelable barrier film for vacuum skin packages and the like. 4,886,690, Cl. 428-36.600.

Davis, Thomas L.; and Harper, Roy A., Jr., to Arrow Specialty Company. Engine breather assembly with oil drain back. 4,886,019, Cl. 123-41.860.

Dawn, Alan W., to James Hardie Irrigation, Inc. Pop-up sprinkler with anti-clogging valve. 4,886,209, Cl. 239-116.000.

Dayco Products, Inc.: *See*—
Henderson, Dewey D., 4,886,483, Cl. 474-135.000.

De La Broise, Marc; Tanguy, Christian; and Kervagoret, Gilbert, to Bendix France. Hydraulic circuit for a motor vehicle. 4,886,321, Cl. 303-92.000.

De La Cuadra Herrera, Antonio: *See*—
Menendez, Francisco J. S.; Menendez, Fernando M. S.; De La Cuadra Herrera, Antonio; Tamargo, Francisco A.; Lorenzo, Luis P.; Valcarcel, Matias R.; and Fernandez, Vicente A., 4,886,648, Cl. 423-92.000.

Deambrosio, Carlos; and Morris, James M., to Electrovert Limited. Solder wave nozzle construction. 4,886,201, Cl. 228-37.000.

Dearwester, Donald D., to Procter & Gamble Company, The. Compact, core-wound paper product. 4,886,167, Cl. 206-389.000.

Deaton, Thomas M.: *See*—
Perkins, Donald H.; Deaton, Thomas M.; and Sizer, Phillip S., 4,886,114, Cl. 166-65.100.

de Baynast de Septfontaines, Regis J. M. P.; Brouard, Francois E. M. E.; Baret, Jean-Luc A. G.; Gicquiaux, Yvon G. A. J. M.; and Olsen, Hans S., to Sucre Recherches et Developpement; and Novo Industri A/S. Process for the liquefaction of beets and chicory roots by enzymatic hydrolysis and liquid hydrolysate obtained. 4,886,672, Cl. 426-48.000.

de Belder, Anthony N.; and Malson, Thomas, to Pharmacia AB. Method of preventing adhesion between body tissues, means for preventing such adhesion, and process for producing said means. 4,886,787, Cl. 514-57.000.

Debs, Victor. Venetian blind. 4,886,102, Cl. 160-177.000.

Dee Sign Co.: *See*—
Huenefeld, Robert C., 4,885,860, Cl. 40-606.000.

de Gabrielli, Olivier: *See*—
Menet, Jacques; and de Gabrielli, Olivier, 4,886,992, Cl. 313-153.000.

Degen, Peter J.: *See*—
Gsell, Thomas C.; Salinaro, Richard F.; and Degen, Peter J., 4,886,836, Cl. 521-53.000.

Deguchi, Naoyasu; Kamei, Sadao; Goda, Kensuke; Shuto, Sadanobu; and Hayashi, Yasuhiro, to Fuji Photo Film Co., Ltd. Silver halide color photographic material. 4,886,738, Cl. 430-510.000.

Degussa Aktiengesellschaft: *See*—
Haeusler, Johannes, 4,886,908, Cl. 562-567.000.

Dehan, Louis, to Colgate-Palmolive Company. Hydroxy polycarboxylic acid built non-aqueous liquid cleaning composition and method for use, and package therefor. 4,886,615, Cl. 252-90.000.

Deischl, Hans: *See*—
Robitschko, Peter; Claar, Klaus; Deischl, Hans; and Schumacher, Josef, 4,887,065, Cl. 340-430.000.

de Larosiere, Pierre J. Device for separating perforated strips from paper sheets. 4,886,198, Cl. 225-106.000.

Delepine, Jean C. Member for controlling a tap or a faucet. 4,885,819, Cl. 16-121.000.

Del Giudice, Luciano: *See*—
Bastioli, Catia; Bellotti, Vittorio; and Del Giudice, Luciano, 4,886,847, Cl. 524-84.000.

Delhaye, Maurice; Derrien, Michel; and Engerand, Jean-Luc, to Messier-Hispano-Bugatti. Rapid extension shock absorber, in particular for carrier-based aircraft. 4,886,248, Cl. 267-64.260.

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Perrone, Ettore; Alpegiani, Marco; Bedeschi, Angelo; Zarini, Franco; Della Bruna, Costantino; and Franceschi, Giovanni, 4,886,793, Cl. 514-192.000.

Demarest, Philip C., to Thermometrics, Inc. Method of in vivo calibration of a pressure sensor. 4,886,070, Cl. 128-675.000.

Demny, Albert C.; Harwell, J. Matt; Etheridge, Reggie H.; and Bush, Robert E., to Seaboard-Arval Corporation. Universal flexbowl wellhead and well completion method. 4,886,121, Cl. 166-382.000.

Dennis, Robert R. Universal articulatable support for retaining intravenous stands in medical applications. 4,886,237, Cl. 248-289.100.

Denzinger, Walter; Hartmann, Heinrich; Gockel, Ulrich; Richter, Felix; Raubenheimer, Hans-Jurgen; and Winkler, Ekhard, to BASF Aktiengesellschaft. Slightly crosslinked, water-soluble polymaleic acid, its preparation and its use. 4,886,859, Cl. 525-327.800.

De Pugh, Chauncey C.: *See*—
Clark, James W.; and De Pugh, Chauncey C., 4,886,579, Cl. 162-111.000.

Deren, Gary W., to STEMCOR Corporation. Modular furnace lining and hardware system therefor. 4,885,890, Cl. 52-506.000.

Derks, Paul A. H., to OCE-Nederland B.V. Multi-nozzle ink jet printer. 4,887,093, Cl. 346-75.000.

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Van Meurs, Peter; De Rouffignac, Eric P.; Vinegar, Harold J.; and Lucid, Michael F., 4,886,118, Cl. 166-245.000.

DeRoyal Industries, Inc.: *See*—
Neal, Charles O., 4,886,053, Cl. 128-80.00C.

Derrien, Michel: *See*—
Delhaye, Maurice; Derrien, Michel; and Engerand, Jean-Luc, 4,886,248, Cl. 267-64.260.

Derynck, Rik M. A.; and Goeddel, David V., to Genentech, Inc. Nucleic acid encoding TGF-β and its uses. 4,886,747, Cl. 435-69.400.

Desai. Jay: *See*—
Mehl, Jack J.; Wasek, Raymond T.; and Desai, Jay, 4,886,071, Cl. 128-760.000.

Desenclos, Christian; and Regis, Sinoquet, to Sachs-Huret S.A. Indexation control device for a cycle derailleur. 4,885,951, Cl. 74-502.200.

Dessau, Ralph M.; Valyocsik, Ernest W.; and Vartuli, James C., to Mobil Oil Corporation. Catalytic dehydrogenation of hydrocarbons over tin-containing crystalline microporous materials. 4,886,926, Cl. 585-444.000.

Dest Corporation: *See*—
Hodgens, Thomas A.; Lowrie, Amy L.; and Murphy, James R., 4,887,301, Cl. 382-9.000.

Detroit, John F.: *See*—
Records, Robert A.; Luchterhand, Ralph E.; and Detroit, John F., 4,886,156, Cl. 198-692.000.

Deusser, Peter G.; Boehm, Detlef M.; and Becker, Johann A., to U.S. Philips Corp. Storage device for a spare length of at least one optical fibre. 4,886,336, Cl. 350-96.200.

Deutsche Thomson-Brandt GmbH: *See*—
Hartnack, Wolfgang; and Schutze, Herbert, 4,887,157, Cl. 358-133.000.

Devis Ltd.: *See*—
Khurgin, Boris, 4,885,898, Cl. 53-513.000.

Dewald, James R.: *See*—
Klipa, Dennis K.; and Dewald, James R., 4,886,922, Cl. 570-193.000.

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Holter, Heinz; Igelbuscher, Heinrich; Gresch, Heinrich; and Dewert, Heribert, 4,886,000, Cl. 110-345.000.

Dewhurst, John E., to Mobay Corporation. Internal mold release agent for use in reaction injection molding. 4,886,838, Cl. 521-117.000.

Dhein, Rolf: *See*—
Pielartzik, Harald; Dhein, Rolf; Meyer, Rolf-Volker; Traenckner, Hans-Joachim; and Ostlinning, Edgar, 4,886,869, Cl. 528-196.000.

Diafoil Company, Limited: *See*—
Sakamoto, Seiji, 4,886,705, Cl. 428-328.000.

Dicke, Grant D.; and Williams, Jeffrey A. Deflectable mounting for upright mast. 4,886,232, Cl. 248-576.000.

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Jodlbauer, Heinz D., 4,886,675, Cl. 426-242.000.

Dieckmann, Ralf E. Mounting apparatus for a lamp or similar device. 4,887,193, Cl. 362-89.000.

Diesel Kiki Co., Ltd.: *See*—
Iio, Masahiro, 4,886,392, Cl. 403-282.000.

Digangi, Joseph A.; and Call, Daron L. Golf tee platform device. 4,886,276, Cl. 273-201.000.

Digital Equipment Corporation: *See*—
Friedman, Harvey S., 4,887,147, Cl. 357-74.000.
Kent, Allan R.; Read, Harold A.; Henry, Barry A.; Kaczor, Charles E.; Mills, Milton V.; Carn, Ronald C.; Metz, Donald R.; Zagame, Steven P.; and Kirk, Robert C., 4,887,076, Cl. 340-825.160.
Wolrich, Gilbert M.; McLellan, Edward J.; and Yodlowski, Robert A. J., 4,887,232, Cl. 364-754.000.

Dillon, George A.; and Van Mastrigt, Max, to Dillon/Quality Plus, Inc. Shoulder strength adduction device. 4,886,073, Cl. 128-774.000.

Dillon/Quality Plus, Inc.: *See*—
Dillon, George A.; and Van Mastrigt, Max, 4,886,073, Cl. 128-774.000.

Dinizo, Stephen E., to ICI Americas Inc. Process for the production of ortho-nitrobenzonitriles. 4,886,936, Cl. 558-343.000.

Director-General of Agency of Industrial Science and Technology: *See*—
Mukai, Seiichi; Kimura, Masatoshi; and Morita, Shohachi, 4,886,873, Cl. 528-353.000.

Dixon, Robert P.: *See*—
Garner, Terry N.; and Dixon, Robert P., 4,887,311, Cl. 455-76.000.

Djokic, Slobodan; Lopotar, Nevenka; Kobrehel, Gabrijela; Krnjevic, Hrvoje; and Carevic, Olga, to Sour Pliva. 10-dihydro-10-deoxo-11-azaerythronolide a compounds, methods and intermediates for the manufacture thereof and their use in pharmaceuticals and in the manufacture thereof. 4,886,792, Cl. 514-183.000.

Dobashi, Yoshitomi; and Inoue, Akihiro, to Kabushiki Kaisha Toshiba. Gas discharge lamp and apparatus utilizing the same. 4,887,002, Cl. 313-607.000.

Docker, Leslie T.; and Whittleworth, William, to Multilastic Limited. Spring bands for incorporation in spring units. 4,886,249, Cl. 267-91.000.

Dr. Ing. H.c.F. Porsche AG: *See*—
Kroniger, Wilhelm; Martin, Roland; and Aydt, Guenter, 4,886,147, Cl. 188-73.370.

Dr. Karl Thomae GmbH: *See*—
Griss, Gerhart, deceased; Schneider, Claus; Hurnaus, Rudolf; Kobinger, Walter; Pichler, Ludwig; Bauer, Rudolf; Mierau, Joachim; Hinzen, Dieter; and Schingnitz, Gunter, 4,886,812, Cl. 514-321.000.

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Reiffen, Manfred; Hurnaus, Rudolf; Sauter, Robert; Grell, Wolfgang; and Rupprecht, Eckhard, 4,886,814, Cl. 514-326.000.

Doerksen, Bradley L. J. Foldable bookstand. 4,886,231, Cl. 248-455.000.

Doherty, Paul D.; Tackett, Timothy N.; and Gavin, Lawrence R., to General Motors Corporation. Sealed electrical and pneumatic connector. 4,886,466, Cl. 439-191.000.

Doi, Alfred. Ultraviolet protective overcoat for application to heat sensitive record materials. 4,886,774, Cl. 503-226.000.

Doi, Isao: *See*—
Masaki, Kenji; Osawa, Izumi; Fujiwara, Masanori; Doi, Isao; and Takedomi, Yumiko, 4,886,724, Cl. 430-66.000.

Dombou, Munehiko; Tomioka, Isao; Kitabatake, Senji; and Nakejima, Hiroshi, to Unitika Ltd. Process for producing diadenosine tetraphosphate and derivatives thereof. 4,886,749, Cl. 435-89.000.

Dominion Tool & Die Company, Inc.: *See*—
Kinnick, John F.; and Kozlowski, Chester P., 4,886,101, Cl. 157-1.220.

Domstead, Gary R.: *See*—
Ricles, Thomas D.; and Domstead, Gary R., 4,886,127, Cl. 175-4.540.

Donelan, John M. Illuminated house number enclosure. 4,887,195, Cl. 362-147.000.

Donnard, Rene, to Lohr Industrie, S.A. Edge contour for load-carrying deck. 4,886,694, Cl. 428-137.000.

Donnelly Mirrors Limited: *See*—
Molyneux, Keith W.; and Gaffney, Thomas D., 4,886,960, Cl. 250-209.000.

Donofrio, David J.: *See*—
Etchells, Arthur W.; and Donofrio, David J., 4,886,086, Cl. 137-1.000.

Dop, Dennis B.; Freitag, Michael G.; and Zawacki, Norbert W., to Zawacki, Norbert W. Cellular alarm backup system. 4,887,290, Cl. 379-33.000.

Doth, Thomas J., to Texas Instruments Incorporated. Failsafe brake for a multi-wheel vehicle with motor controlled steering. 4,887,013, Cl. 318-489.000.

Dotsch, Willi: *See*—
Noe, Oskar; Noe, Rolf; Noe, Andreas; Dotsch, Willi; and Lux, Herbert, 4,886,199, Cl. 226-118.000.

Douglass, Paul L.: *See*—
Davis, Edward H.; Klaes, Gerald F.; Harris, Jack L.; and Douglass, Paul L., 4,885,928, Cl. 72-410.000.

Dow Chemical Company, The: *See*—
Chen, Bibiana S. Y.; and Henton, David E., 4,886,856, Cl. 525-73.000.
Esquivel H., J. Benjamin, 4,886,965, Cl. 250-252.10A.
Goralski, Christian T.; Singaram, Bakthan; and Brown, Herbert C., 4,886,924, Cl. 585-318.000.
Kleschick, William A.; Ehr, Robert J.; Costales, Mark J.; Gerwick, Ben C., III; Meikle, Richard W., deceased; Monte, William T.; and Pearson, Norman R., 4,886,883, Cl. 544-263.000.
Klipa, Dennis K.; and Dewald, James R., 4,886,922, Cl. 570-193.000.
McCullough, Francis P., Jr.; Cipriano, Robert A.; and Snelgrove, R. Vernon, 4,886,715, Cl. 429-103.000.
Morris, Gregory J. E., 4,886,586, Cl. 204-128.000.

Drain, Kieran F.; and Kadziela, Kris, to Loctite Corporation. Epoxy-amine compositions employing unsaturated imides. 4,886,842, Cl. 522-103.000.

Drescher, Andrzej: *See*—
Vardoulakis, Ionnis G.; and Drescher, Andrzej, 4,885,941, Cl. 73-794.000.

Dresser Industries, Inc.: *See*—
Ricles, Thomas D.; and Domstead, Gary R., 4,886,127, Cl. 175-4.540.

Droge, Karl-Heinz: *See*—
Pieperhoff, Hans J.; and Droge, Karl-Heinz, 4,886,411, Cl. 414-408.000.

Drogo, Pierre L. M. Spindle-receiving jack for forming an electrical connection and electrical connector comprising at least one such jack. 4,886,474, Cl. 439-856.000.

Dromi, Asher: *See*—
Keidar, Itzhak; Dromi, Asher; Tilman, Menahem; and Harel, Joseph, 4,886,161, Cl. 206-246.000.

Drori, Ze'ev; and Amirpoor, Manssor M., to Clifford Electronics, Inc. Multi-featured security system with self-diagnostic capability. 4,887,064, Cl. 340-426.000.

Drusch, John A., III: *See*—
Iams, John F.; Splane, Robson L., Jr.; and Drusch, John A., III, 4,886,050, Cl. 128-25.00R.

Dubroc, Donald J. Hunter's tree stand. 4,886,143, Cl. 182-142.000.

Ducane Company, Inc., The: *See*—
Ducate, John S., Jr.; Berger, Bernard; Boatwright, Neal; and Walters, Jon S., 4,886,045, Cl. 126-41.00R.

Ducate, John S., Jr.; Berger, Bernard; Boatwright, Neal; and Walters, Jon S., to Ducane Company, Inc., The. Side burner attachment for gas-fired grill. 4,886,045, Cl. 126-41.00R.

Duce, Richard W., to General Motors Corporation. Vertical rotary indirect printer. 4,885,992, Cl. 101-38.100.

Ducorday, Gerard M. Book cover. 4,886,299, Cl. 281-31.000.

Duenas, Santiago: *See*—
Trube, Hans; Korber, Jurgen; and Duenas, Santiago, 4,886,311, Cl. 296-37.120.

Dumont, Christian: *See*—
Ostermann, Friedrich; Dumont, Christian; Balbach, Rainer; and Sollner, Gerhard, 4,886,713, Cl. 428-687.000.

Duoject Medical Systems Inc.: *See*—
Reynolds, David L., 4,886,495, Cl. 604-88.000.

Dupont, Andre G.: *See*—
Dupont, Gaston L.; and Dupont, Andre G., 4,886,139, Cl. 182-146.000.

Du Pont de Nemours, E. I., and Company: *See*—
Chan, Dominic M.; El-Sayed, Lyla M.; Thanawalla, Chandrakant B.; and Trout, Torence J., 4,886,726, Cl. 430-115.000.
Chiang, George C.; and Toji, Masuo, 4,886,881, Cl. 544-194.000.
Gay, Frank P.; Logullo, Francis M.; Luise, Robert R.; and Mack, Mark P., 4,886,875, Cl. 525-439.000.
Hendren, Gary L.; Provost, Richard L.; Fried, Kim L.; and Taylor, Leland A., 4,886,578, Cl. 162-123.000.
Janowicz, Andrew H., 4,886,861, Cl. 526-145.000.

Dupont, Gaston L.; and Dupont, Andre G. Mobile scaffold with power-operated platform elevation. 4,886,139, Cl. 182-146.000.

Dussinger, Thomas E.; Riley, John M.; and Kosarko, Gerald J., to Eastman Kodak Company. Double-sided magnetic recording device supporting two transducers in fixed relation. 4,887,176, Cl. 360-105.000.

Dussourd, Jules L., to Sundstrand Corporation. Single stage pump and separator for two phase gas and liquid mixtures. 4,886,530, Cl. 55-199.000.

Dutton, Bradley C. Broadcast data storage and retrieval system. 4,887,308, Cl. 455-156.000.

Dutzmann, Stefan: *See*—
Fest, Christa; Findeisen, Kurt; Brandes, Wilhelm; Dutzmann, Stefan; Hanssler, Gerd; and Reinecke, Paul, 4,886,832, Cl. 514-477.000.

Dwivedi, Ratnesh K., to Lanxide Technology Company, LP. Method of making ceramic composite articles and articles made thereby. 4,886,766, Cl. 501-87.000.

Dysarz, Edward D. Device and method to safely elevate stabilize and lower a wheel chair. 4,886,288, Cl. 280-250.100.

Dziemba, Peter, to MAP Mikrofilm Apparatebau, Dr. Poehler GmbH & Co. KG. Optical scanning device as well as a microfilm reader-printer with such a device. 4,886,329, Cl. 350-6.500.

E-Systems, Inc.: *See*—
Rose, James B., 4,887,171, Cl. 360-31.000.

E Z Breathe, Inc.: *See*—
Nave, Jerald L., 4,886,057, Cl. 128-203.110.

Eagle-Picher Industries, Inc.: *See*—
Hayes, Richard H., 4,885,936, Cl. 73-146.000.

Early, James T.; and Hargrove, R. Steven, to United States of America, Energy. Method for making mirrored surfaces comprising superconducting material. 4,886,776, Cl. 505-1.000.

Eash, Matthew G.: *See*—
Roemer, Peter B.; Edelstein, William A.; Hayes, Cecil E.; and Eash, Matthew G., 4,887,039, Cl. 324-322.000.

Eastern Oil Tools PTE Ltd.: *See*—
Leggett, Henry H.; and Kitney, Howard R., 4,886,115, Cl. 166-77.000.

Eastman Kodak Company: *See*—
Dussinger, Thomas E.; Riley, John M.; and Kosarko, Gerald J., 4,887,176, Cl. 360-105.000.

Foster, Bruce W.; Clubb, Clyde N.; and Stuart, Richard K., Jr., 4,886,853, Cl. 524-477.000.
Harvey, Donald M., 4,887,110, Cl. 354-275.000.
Izumi, Masaki; and Miura, Tsutomu, 4,887,094, Cl. 346-76.0PH.
Jamali, Jamal; and Roztocil, Tomas, 4,887,128, Cl. 355-202.000.
Joseph, Brian J.; and Hilbert, Thomas K., 4,887,132, Cl. 355-253.000.
Jungquist, Robert K., 4,886,363, Cl. 356-349.000.
Larkins, Thomas H., Jr., 4,886,905, Cl. 560-265.000.
Niedospial, John J., Jr.; Robertson, Jeffrey C.; and Fraser, Mark D., 4,887,112, Cl. 354-275.000.
Niedospial, John J., Jr., 4,887,113, Cl. 354-275.000.
Pritchard, Jeffrey A., 4,887,121, Cl. 354-430.000.
Przezdziecki, Wojciech M., 4,886,739, Cl. 430-617.000.
Scozzafava, Michael; Specht, Donald P.; Ulman, Abraham; Willand, Craig S.; and Williams, David J., 4,886,339, Cl. 350-96.340.

Ebara Corporation: *See—*
Matake, Kozo, 4,886,378, Cl. 384-308.000.

Ebel, Klaus; and Reuther, Wolfgang, to BASF Aktiengesellschaft. Hydroxyoxaalkylmelamines. 4,886,882, Cl. 544-196.000.

Eberle, Jurg: *See—*
Ruess, Wilhelm; Urech, Pierre; Eberle, Jurg; and Staub, Theodor, 4,886,824, Cl. 514-383.000.
Ruess, Wilhelm; Urech, Pierre; Eberle, Jurg; and Staub, Theodor, 4,886,825, Cl. 514-383.000.

Ebihara, Keiko: *See—*
Kitagaki, Kanshiro; Ebihara, Keiko; Morioka, Shigeo; Nakamura, Takao; and Okada, Taizo, 4,886,667, Cl. 424-195.100.

Eck, Leonard; Liegel, Reinald D.; Naber, Charles; and Sabel, Garry J., to Hein-Werner Corporation. Pneumatic hydraulic side lifting jack. 4,886,242, Cl. 254-8.00B.

Edagawa, Setsuji: *See—*
Nakai, Hirotaka; and Edagawa, Setsuji, 4,886,972, Cl. 250-504.00R.

Edelstein, William A.: *See—*
Roemer, Peter B.; Edelstein, William A.; Hayes, Cecil E.; and Eash, Matthew G., 4,887,039, Cl. 324-322.000.

Edwards, Bruce E.: *See—*
Holloway, John T.; Moon, David A.; Cannon, Howard I.; Knight, Thomas F.; Edwards, Bruce E.; and Weinreb, Daniel L., 4,887,235, Cl. 364-900.000.

Efamol Limited: *See—*
Horrobin, David F., 4,886,670, Cl. 424-677.000.

Effinger, Mark A., to O'Ryan Industries. Methods and apparatus for generating light patterns responsive to audio frequency input signals. 4,887,197, Cl. 362-306.000.

Egawa, Akira: *See—*
Karube, Norio; Egawa, Akira; Yamazaki, Etsuo; Iehisa, Nobuaki; and Manabe, Mitsuo, 4,887,272, Cl. 372-38.000.

Egawa, Hiroshi: *See—*
Matsumoto, Jun-ichi; Miyamoto, Teruyuki; Egawa, Hiroshi; and Nakamura, Shinichi, 4,886,810, Cl. 514-312.000.

Ehlers, Manfred: *See—*
Ehnert, Gerd; Ehlers, Manfred; Sauer, Gerhard; and Vogel, Klaus, 4,886,701, Cl. 428-282.000.

Ehnert, Gerd; Ehlers, Manfred; Sauer, Gerhard; and Vogel, Klaus, to Menzolit GmbH. Process for producing a tangled fibre material from glass fibres and polymer for the production of glass fibre-reinforced plastic mouldings and apparatus for performing the process. 4,886,701, Cl. 428-282.000.

Ehr, Robert J.: *See—*
Kleschick, William A.; Ehr, Robert J.; Costales, Mark J.; Gerwick, Ben C., III; Meikle, Richard W., deceased; Monte, William T.; and Pearson, Norman R., 4,886,883, Cl. 544-263.000.

Ehrmann, Peter; Spies, Karl-Heinz; and Vogt, Rolf, to Carl Freudenberg, Firma. Sealing ring having a sealing surfacer with a recessional annular projection. 4,886,281, Cl. 277-47.000.

Eibl, Johann; Linnau, Yendra; and Schwarz, Otto, to Immuno Aktiengesellschaft fur Chemisch-Medizinische Produkte. Method of determining incompatibility-reaction-causing substances in blood products as well as a method of inactivating said incompatibility-reaction-causing substances. 4,886,758, Cl. 435-269.000.

Eich, Manfred; and Wendorff, Joachim, to Rohm GMBH Chemische Fabrik. Device for reversible optical data storage. 4,886,718, Cl. 430-20.000.

Eichner, Ronald D.; and Mullbacher, Arno, to Australian National University. Immunoregulation. 4,886,796, Cl. 514-211.000.

Eidenschink, Rudolf: *See—*
Hopf, Reinhard; Scheuble, Bernhard; Wachtler, Andreas; Hittich, Reinhard; Eidenschink, Rudolf; Geelhaar, Thomas; Krause, Joachim; and Reiffenrath, Volker, 4,886,620, Cl. 252-299.610.

Eisai Co., Ltd.: *See—*
Yamagishi, Youji; Akasaka, Kozo; Suzuki, Takeshi; Miyamoto, Mitsuaki; Nakamoto, Kouji; Okano, Kazuo; Abe, Shinya; Ikuta, Hironori; Hayashi, Kenji; Yoshimura, Hiroyuki; Fujimori, Tohru; Harada, Koukichi; and Yamatsu, Isao, 4,886,834, Cl. 514-521.000.

Ekstrom, Jan: *See—*
Aaltonen, Olli; Martikainen, Antti; Rantala, Borje; Ekstrom, Jan; and Toikka, Osmo, 4,886,528, Cl. 55-158.000.

Eldridge, John D., Jr. Window shade apparatus. 4,886,104, Cl. 160-370.200.

Electro-Matic Products Co.: *See—*
Armond, Joseph A., 4,887,184, Cl. 361-149.000.

Electrovert Limited: *See—*
Deambrosio, Carlos; and Morris, James M., 4,886,201, Cl. 228-37.000.

Eli Lilly and Company: *See—*
Richardson, Mark A., 4,886,757, Cl. 435-252.300.

Elpatronic AG: *See—*
Urech, Werner, 4,886,953, Cl. 219-64.000.

El-Sayed, Lyla M.: *See—*
Chan, Dominic M.; El-Sayed, Lyla M.; Thanawalla, Chandrakant B.; and Trout, Torence J., 4,886,726, Cl. 430-115.000.

El-Tibi, Abdul-Kader A.: *See—*
Lovgren, Eric M.; and El-Tibi, Abdul-Kader A., 4,886,506, Cl. 604-280.000.

Emami, Alan: *See—*
Yu, Chorng-Tao; Fisk, Michael A.; and Emami, Alan, 4,886,954, Cl. 219-390.000.

Embree, David M.; and Logan, Shawn M., to American Telephone and Telegraph Company; and AT&T Bell Laboratories. High frequency VLSI oscillator. 4,887,053, Cl. 331-116.0FE.

Emerson Electric Co.: *See—*
Barker, Alan R., 4,886,990, Cl. 310-184.000.

Emile Pfalzgraf "EPB", S.A.: *See—*
Pfalzgraf, Emile, 4,886,402, Cl. 409-234.000.

Emmons, William D.: *See—*
Novak, Ronald W.; and Emmons, William D., 4,886,618, Cl. 252-188.280.

Emptage, Richard S.: *See—*
Field, Ronald L.; and Emptage, Richard S., 4,886,996, Cl. 313-400.000.

Endo, Satoru, to Hitachi, Ltd. Electron gun electrode for a color picture tube. 4,886,998, Cl. 313-414.000.

Endo, Toshio; and Sato, Mitsuo, to Ricoh Company, Ltd. Thermally operated apparatus for making a plate. 4,887,168, Cl. 358-299.000.

Endoh, Shinji: *See—*
Mitsuhashi, Shigeru; Kondo, Hitoshi; Okazaki, Tetsuharu; Endoh, Shinji; Kudo, Hiroko; Yamaguchi, Akio; Tsuruta, Haruki; and Akutagawa, Susumu, 4,886,623, Cl. 252-299.650.

Endress u. Hauser GmbH u. Co.: *See—*
Rottmar, Werner; and Schmidt, Klaus, 4,886,938, Cl. 174-52.100.

Engelberger, Raimund; Harmsen, Siegfried; Kirchgessner, Hilmar; and Schneider, Josef, to Papst-Motoren GmbH. Fan with an essentially square housing. 4,886,415, Cl. 415-119.000.

Engelstoft, Mogens: *See—*
Watjen, Frank; and Engelstoft, Mogens, 4,886,797, Cl. 514-220.000.

Engerand, Jean-Luc: *See—*
Delhaye, Maurice; Derrien, Michel; and Engerand, Jean-Luc, 4,886,248, Cl. 267-64.260.

Engineering Enterprises, Inc.: *See—*
Kimberlin, Denver K., 4,886,432, Cl. 417-478.000.

Engineering Measurments Company: *See—*
Catch, John B., 4,886,420, Cl. 416-174.000.

English, Stanley R.: *See—*
Wawro, Thaddeus J.; English, Stanley R.; and Danna, Dominick, 4,887,154, Cl. 358-98.000.

English, William S., to Sturtevant, Inc. Method of making a retrofit side draft classifier. 4,885,832, Cl. 29-401.100.

Enichem Sintesi S.p.A.: *See—*
Neri, Carlo; Nodari, Nereo; and Sandre, Giovanni, 4,886,900, Cl. 560-75.000.

ENIGMA, NV: *See—*
Markessini, Efthalia V.; and Markessini, Andrew C., 4,886,854, Cl. 524-14.000.

Eniricerche S.p.A.: *See—*
Roggero, Arnaldo; Scrosati, Bruno; Andrei, Maria; Passerini, Stefano; and Pedretti, Ugo, 4,886,716, Cl. 429-192.000.

Entravision, Inc.: *See—*
Newton, Walter A., 4,886,498, Cl. 604-118.000.

Enviro Med, Inc.: *See—*
Stein, Israel M.; Goodman, Alan S.; and Romanow, Richard, 4,886,164, Cl. 206-366.000.

Environmental Research Institute of Michigan: *See—*
Peterson, Lauren M., 4,886,331, Cl. 350-96.120.

Eparco: *See—*
Herve, Philip, 4,886,605, Cl. 210-170.000.

Erceg, Jack P.; and Yeh, Tzong I., to Packaging Industries Group, Inc. Plastic hinge, hinged material, and method for hinging. 4,885,820, Cl. 16-225.000.

Eriksson, Jan E., to Asea Brown Boveri AB. Movable strand stirrer. 4,886,109, Cl. 164-504.000.

Erling, Frederiksen, to Aktieselskabet Bruel & Kjaer. Pressure gradient microphone. 4,887,300, Cl. 381-168.000.

Erving, Richard H., to American Telephone and Telegraph Company; and AT&T Information Systems Inc. Self calibration arrangement for a voice switched speakerphone. 4,887,288, Cl. 379-6.000.

Eshima, Taizo; Yasutake, Kunihiro; and Yamasaki, Katuhiko, to Mitsubishi Denki Kabushiki Kaisha. Apparatus for forming leads of semiconductor devices. 4,885,837, Cl. 29-564.000.

Eskofot: *See—*
Hougaard, Finn, 4,887,126, Cl. 355-75.000.

Esquivel H., J. Benjamin, to Dow Chemical Company, The. Method for calibrating variable wavelength liquid chromatography detectors. 4,886,965, Cl. 250-252.10A.

Establecimientos Industrales Quimicos Oxiquim S.A.: *See—*
Saphores Wiedmaier, Eugenio A.; Gleisner Klempau, Arturo G.; Vega de Kuyper, Juan C.; and Mardones Parra, Wladimir A., 4,886,595, Cl. 209-166.000.

Estee Lauder, Inc.: *See—*
Goldberg, Ronald N.; Mavroudis, Eugene G.; and Ferguson, Susan H., 4,886,387, Cl. 401-122.000.

Etablissement Supervis: *See*—
Lutz, Christian, 4,886,480, Cl. 464-112.000.

Etchells, Arthur W.; and Donofrio, David J., to Graco, Inc. Non-degrading pressure regulator. 4,886,086, Cl. 137-1.000.

Etheridge, Reggie H.: *See*—
Demny, Albert C.; Harwell, J. Matt; Etheridge, Reggie H.; and Bush, Robert E., 4,886,121, Cl. 166-382.000.

Eude, Gerard: *See*—
Guichard, Jacques; and Eude, Gerard, 4,887,158, Cl. 358-143.000.

Eurofloor S.A.: *See*—
Marchal, Daniel, 4,886,708, Cl. 428-447.000.

Europaische Atomgemeinschaft (EURATOM): *See*—
Murray, Charles N.; and Fortescue, Thomas R., 4,887,040, Cl. 324-446.000.

Eustache, Jacques: *See*—
Shroot, Braham; Eustache, Jacques; and Bouclier, Martine, 4,886,907, Cl. 562-490.000.

Evans, Robert F. Nutational technique for limiting well bore deviation. 4,886,130, Cl. 175-73.000.

Evert, Daniel D.: *See*—
Willey, Monroe J.; and Evert, Daniel D., 4,886,170, Cl. 206-609.000.

Ewald Witte & Co.: *See*—
Ruckert, Edvard, 4,886,307, Cl. 292-216.000.

Excelermatic Inc.: *See*—
Kraus, Charles E., 4,885,955, Cl. 74-691.000.

Executive Technical Services, Inc.: *See*—
Garrett, James R., 4,887,189, Cl. 362-23.000.

Eye Research Institute of Retina Foundation: *See*—
Austin, William L., 4,887,270, Cl. 372-22.000.

Fabbri, Roberto: *See*—
Cuffiani, Illaro; Fabbri, Roberto; Margelli, Gian F.; and Zucchini, Umberto, 4,886,770, Cl. 502-104.000.

FAG Kugelfischer Georg Schafer (KGaA): *See*—
Bayer, Oswald, 4,886,379, Cl. 384-523.000.
Macht, Egid; and Hagel, Thomas, 4,885,979, Cl. 91-369.100.

Fagen, Shawn J.: *See*—
Sadamune, Dean J.; and Fagen, Shawn J., 4,887,190, Cl. 362-32.000.

Failli, Amadeo A.: *See*—
Kinney, William A.; Failli, Amadeo A.; and Mir, Ghulam N., 4,886,821, Cl. 514-357.000.

Falco, Gene A. Combination manual or impact drive enhancement of portable injection tool. 4,886,188, Cl. 222-1.000.

Fanghanel, Egon: *See*—
Gruber, Harald; Richter, Andreas M.; Fanghanel, Egon; Roth, Hans-Klaus; Friedrich, Heinz; and Maras, Siegfried, 4,886,627, Cl. 252-513.000.

Fano International Limited: *See*—
Kraaij, Wouter; and Visser, Meindert, 4,887,004, Cl. 315-86.000.

Fanuc Ltd.: *See*—
Kiya, Nobuyuki; and Sakamoto, Keiji, 4,887,012, Cl. 318-434.000.
Kiya, Nobuyuki; Toriyama, Shuji; and Saiki, Yoshiharu, 4,887,220, Cl. 364-474.110.
Kurakake, Mitsuo; and Sakamoto, Keiji, 4,887,015, Cl. 318-609.000.

Fanuc Ltd: *See*—
Karube, Norio; Egawa, Akira; Yamazaki, Etsuo; Iehisa, Nobuaki; and Manabe, Mitsuo, 4,887,272, Cl. 372-38.000.

Fargnoli, Gianni: *See*—
Bonfiglioli, Silverio; Fargnoli, Gianni; and Fato, Massimo, 4,886,025, Cl. 123-339.000.

Farkonas, John, to Viskase Corporation. Method and apparatus for severing shirred tubular food casing and article. 4,885,821, Cl. 17-49.000.

Farmitalia Carlo Erba, S.r.l.: *See*—
Perrone, Ettore; Alpegiani, Marco; Bedeschi, Angelo; Zarini, Franco; Della Bruna, Costantino; and Franceschi, Giovanni, 4,886,793, Cl. 514-192.000.

Fatigue Technology, Incorporated: *See*—
Landy, Michael A., 4,885,829, Cl. 29-156.80R.

Fato, Massimo: *See*—
Bonfiglioli, Silverio; Fargnoli, Gianni; and Fato, Massimo, 4,886,025, Cl. 123-339.000.

Faulk, Ward P. Conjugates of apotransferrin proteins with anti-tumor agents. 4,886,780, Cl. 514-8.000.

Favstritsky, Nicolai A., to Great Lakes Chemical Corporation. Water soluble organic ammonium per halides. 4,886,915, Cl. 564-503.000.

Favstritsky, Nicolai A.: *See*—
Shin, Charles C.; Favstritsky, Nicolai A.; and Dadgar, Ahmad, 4,886,543, Cl. 71-88.000.

Fearing, D. Michael: *See*—
Marks, George B., Sr.; and Fearing, D. Michael, 4,885,855, Cl. 40-301.000.

Fearing Manufacturing Co., Inc.: *See*—
Marks, George B., Sr.; and Fearing, D. Michael, 4,885,855, Cl. 40-301.000.

Fedelem, William E.; and Hutter, Robert B., to Chrysler Motors Corporation. Fuel filler assembly. 4,886,182, Cl. 220-85.00F.

Fehrenbach, Waltraud: *See*—
Scheuble, Bernhard; Baur, Gunter; and Fehrenbach, Waltraud, 4,886,344, Cl. 350-350.00R.

Fehrentz, Jean: *See*—
Castro, Bertrand; and Fehrentz, Jean, 4,886,914, Cl. 564-343.000.

Feist, Norbert, to Battenfeld Maschinenfabriken GmbH. Apparatus for proportioning reaction mixtures. 4,886,643, Cl. 422-133.000.

Felix, Kenneth A., to Motorola, Inc. Packet-switched cellular telephone system. 4,887,265, Cl. 370-94.100.

Feller, Roger K.; Warner, Samuel R.; and Capriotti, Janice D., to Ford Motor Company. Engine testing system. 4,885,935, Cl. 73-117.200.

Feller, Walter J.: *See*—
Maki, Melvin C.; Feller, Walter J.; and Adams, Edward L., 4,887,069, Cl. 340-552.000.

Fellows, Constance A.; Hecht, Patrick G.; and Levin, Steven B., to Rhone-Poulenc Nederland, B.V. Process for preparing 2-methyl-2-(methylthio) propionaldehyde O-(methylcarbamoyl) oxime as a water-wet cake. 4,886,913, Cl. 564-255.000.

Fender, C. Leo. Moisture-free electromagnetic pickup for an electrical musical instrument of the stringed type. 4,885,970, Cl. 84-1.150.

Feraf AG: *See*—
Haensch, Egon, 4,886,264, Cl. 271-229.000.

Ferag AG: *See*—
Reist, Walter, 4,886,260, Cl. 270-60.000.
Wetter, Jakob, 4,886,265, Cl. 271-279.000.

Ferguson, Susan H.: *See*—
Goldberg, Ronald N.; Mavroudis, Eugene G.; and Ferguson, Susan H., 4,886,387, Cl. 401-122.000.

Fernandes, Roosevelt A.; and Sieron, Richard L., to Niagara Mohawk Power Corporation. Transmission line sensor apparatus operable with near zero current line conditions. 4,886,980, Cl. 307-64.000.

Fernandez, Vicente A.: *See*—
Menendez, Francisco J. S.; Menendez, Fernando M. S.; De La Cuadra Herrera, Antonio; Tamargo, Francisco A.; Lorenzo, Luis P.; Valcarcel, Matias R.; and Fernandez, Vicente A., 4,886,648, Cl. 423-92.000.

Ferrari, Paolo: *See*—
Bertotti, Franco; Ferrari, Paolo; and Gatti, Maria T., 4,887,141, Cl. 357-36.000.

Ferreira de Abreu, Alfredo, to Mida—Maquinas Industriais do Ave, Lda. Woodworking machine with feeding system. 4,886,099, Cl. 144-117.00R.

Ferroli, Paolo, to Ferroli, Paolo. Boiler element. 4,886,018, Cl. 122-367.00C.

Fest, Christa; Findeisen, Kurt; Brandes, Wilhelm; Dutzmann, Stefan; Hanssler, Gerd; and Reinecke, Paul, to Bayer Aktiengesellschaft. Fungicidal benzaldoxime derivatives. 4,886,832, Cl. 514-477.000.

Fett, Gregory A., to Dana Corporation. Method for forming a contour hardened gear. 4,885,831, Cl. 29-159.200.

Fiat Auto S.p.A.: *See*—
Re Fiorentin, Stefano; and Gaudenzi, Renzo, 4,887,025, Cl. 324-65.00R.

Fibercast Company: *See*—
Martin, Carl E., 4,886,305, Cl. 85-133.100.

Fibrestone Inc.: *See*—
Sudrabin, David A.; and Grunau, Klaus, 4,885,880, Cl. 52-169.600.

Fichtel & Sachs AG: *See*—
Lutz, Manfred, 4,885,922, Cl. 70-264.000.

Fiedler, Volker-Bernd: *See*—
Niewohner, Ulrich; Hoever, Franz-Peter; Lieb, Folker; Rosentreter, Ulrich; Perzborn, Elisabeth; Fiedler, Volker-Bernd; and Seuter, Friedel, 4,886,898, Cl. 560-42.000.

Field, Ronald L.; and Emptage, Richard S., to U.S. Philips Corporation. Channel plate electron multipliers. 4,886,996, Cl. 313-400.000.

Fields, Tom R. Headband for holding flashlights directed at a viewing area. 4,887,194, Cl. 362-105.000.

Fierro, Joseph, to Heinemann Electric Company. Circuit breaker printed circuit board connector device. 4,886,462, Cl. 439-79.000.

Filby, Paul K.: *See*—
Baines, David A.; Filby, Paul K.; and Kierstan, Marek P. J., 4,886,659, Cl. 424-63.000.

Findeisen, Kurt: *See*—
Fest, Christa; Findeisen, Kurt; Brandes, Wilhelm; Dutzmann, Stefan; Hanssler, Gerd; and Reinecke, Paul, 4,886,832, Cl. 514-477.000.

Fink, Hans-Ferdi; Berger, Roland; Heilen, Wernfried; and Muss, Peter, to Th. Goldschmidt AG. Method for improving the scratch resistance and increasing the sliding ability of coated surfaces and improved coating materials. 4,886,551, Cl. 106-183.000.

Finkl, Charles W., to A. Finkl & Sons Co. Electric arc furnace. 4,887,277, Cl. 373-71.000.

Finlan, Martin F., to Amersham International plc. Method and apparatus for particle analysis. 4,886,360, Cl. 356-335.000.

Finnegan, Stephen A.: *See*—
Backman, Marvin E.; Finnegan, Stephen A.; Whitman, Kent G.; and Sewell, Robert G. S., 4,885,994, Cl. 102-473.000.

Fisch, Alain: *See*—
Cyprien Guy; Fisch, Alain; Haggiage, Johnny; Porte, Hugues; Prazuck, Thierry; and Torres, Ghislaine, 4,886,661, Cl. 424-78.000.

Fischell, Robert E.; and Fischell, Tim A., to MedInnovations, Inc. Expandable pullback atherectomy catheter system. 4,886,061, Cl. 128-305.000.

Fischell, Tim A.: *See*—
Fischell, Robert E.; and Fischell, Tim A., 4,886,061, Cl. 128-305.000.

Fischer, Martin: *See*—
Boettcher, Andreas; Fischer, Martin; Aldag, Reinhard; and Bluemel, Thomas, 4,886,735, Cl. 430-332.000.

Fischer, Melchior; and Gaiffi, Nazareno, to BBC Brown Boveri AG. Ozone generator. 4,886,645, Cl. 422-186.180.

Fisher Controls International, Inc.: *See*—
Davis, James R.; and Wilson, Robert T., 4,886,241, Cl. 251-214.000.

Fisher, Leo: *See*—
Cope, Richard P.; and Fisher, Leo, 4,886,626, Cl. 252-500.000.

Fisk, Michael A.: *See*—
Yu, Chorng-Tao; Fisk, Michael A.; and Emami, Alan, 4,886,954, Cl. 219-390.000.

Fitzsimmons, Julie-Anna. Baby accessory carrier. 4,886,150, Cl. 190-1.000.

Fleming, Keith A. Beverage container holder. 4,886,183, Cl. 220-85.00H.

Fleming, Randy G.: *See*—
Bragg, Dale E.; Clark, Mark A.; and Fleming, Randy G., 4,886,367, Cl. 366-132.000.

Fleshman Jr., William D., to AMP Incorporated. Vacuum seal for electrical connector. 4,886,471, Cl. 439-587.000.

Flohrs, Peter; Heyke, Klaus; Michel, Hartmut; and Nelle, Ulrich, to Robert Bosch GmbH. Transistor arrangement with an output transistor. 4,886,985, Cl. 307-315.000.

FMC Corporation: *See*—
Leon, Michael A., 4,886,413, Cl. 414-495.000.

Focke & Co. (GmbH & Co.): *See*—
Focke, Heinz; and Wach, Jurgen, 4,885,895, Cl. 53-73.000.

Focke, Heinz; and Wach, Jurgen, to Focke & Co. (GmbH & Co.). Process and apparatus for feeding blanks to a folding unit. 4,885,895, Cl. 53-73.000.

Foldvary, Leslie A., to General Motors Corporation. Catalytic converter metal monolithic catalyst substrate. 4,886,711, Cl. 428-592.000.

Foley, William M., Jr., to John D. McCarry. Silymethylene methacrylate contact lens and polymer. 4,886,864, Cl. 526-264.000.

Fonar Corporation: *See*—
Votruba, Jan; and Morris, George R., 4,887,038, Cl. 324-318.000.

Fondeur, Bernard, to D.E.A. Digital Electronic Automation S.p.A. Measuring device employing laser interferometry. 4,886,353, Cl. 356-4.500.

Fondin, Jean L. Sensor for measuring the internal temperature of a centrifuge cell. 4,886,371, Cl. 374-141.000.

Fong, Dodd W.; and Fu, Josepha M., to Nalco Chemical Company. Novel cationic hydroxamate polymers. 4,886,872, Cl. 525-329.400.

Fong, Hanry. Plant container. 4,885,870, Cl. 47-79.000.

Food Equipment Engineering, Inc.: *See*—
Lortz, James L., 4,886,441, Cl. 425-236.000.

Forbes, Chritopher B. Repair flange. 4,886,302, Cl. 285-56.000.

Ford Motor Company: *See*—
Cook, Jeffrey A., 4,886,026, Cl. 123-478.000.
Feller, Roger K.; Warner, Samuel R.; and Capriotti, Janice D., 4,885,935, Cl. 73-117.200.
Hetrick, Robert E., 4,887,032, Cl. 324-207.000.
Kennedy, Robert D., 4,886,228, Cl. 248-74.100.

Forman, Meryl A.: *See*—
Kortright, Kenneth H.; Hofheinz, David E.; Forman, Meryl A.; Lee, Song Y.; Smariga, Paulette E.; and Stoner, Candie S., 4,886,742, Cl. 435-5.000.

Forrest, Alexander; and Gordon, Anthony J. Apparatus for producing a restructured food product. 4,886,440, Cl. 425-208.000.

Forshee, Gregory. Deck covering. 4,885,882, Cl. 52-177.000.

Forster, Josef; and Selinger, Johann, to Siemens Aktiengesellschaft. Gripping tool for a device for the remote-controlled removal of samples from a container, in particular from a pressure vessel of a reactor. 4,886,635, Cl. 376-268.000.

Fortescue, Thomas R.: *See*—
Murray, Charles N.; and Fortescue, Thomas R., 4,887,040, Cl. 324-446.000.

Fortuna-Werke Maschinenfabrik GmbH: *See*—
Wedeniwski, Horst J., 4,885,874, Cl. 51-165.770.

Foster, Bruce W.; Clubb, Clyde N.; and Stuart, Richard K., Jr., to Eastman Kodak Company. Hot-melt adhesive composition. 4,886,853, Cl. 524-477.000.

Foster, Kevin D., to Porex Technologies Corp. of Georgia. Cap for tubes. 4,886,177, Cl. 215-247.000.

Fottinger, Walter; Hauber, Michael; and Weghmann, Arnold, to Carl Freudenberg, Firma. Multilayer electret filter and process of using same. 4,886,527, Cl. 55-156.000.

France, Donald J.: *See*—
Asato, Goro; and France, Donald J., 4,886,784, Cl. 514-30.000.

Franceschi, Giovanni: *See*—
Perrone, Ettore; Alpegiani, Marco; Bedeschi, Angelo; Zarini, Franco; Della Bruna, Costantino; and Franceschi, Giovanni, 4,886,793, Cl. 514-192.000.

Franceus, Paul E. Radon removal apparatus. 4,885,984, Cl. 98-42.020.

Franckowiak, Gerhard; Bechem, Martin; Gross, Rainer; Hebisch, Siegfried; and Schramm, Matthias, to Bayer Aktiengesellschaft. Circulation-active dihydropyridine ethers. 4,886,804, Cl. 514-252.000.

Franckowiak, Gerhard; Marhold, Albrecht; Bechem, Martin; Gross, Rainer; Kayser, Michael; Schramm, Matthias; and Thomas, Gunther, to Bayer Aktiengesellschaft. Circulation-active dioxyalkylenearyldihydropyridines. 4,886,816, Cl. 514-338.000.

Francotyp-Postalia GmbH: *See*—
Harry, Alan, 4,886,384, Cl. 400-223.000.

Franke, Adrian R.; and Hull, Harold L. Coffee filter retainer. 4,885,987, Cl. 99-295.000.

Franks, George J., Jr. Slide switch with an extendible actuator. 4,886,946, Cl. 200-329.000.

Fraser, Mark D.: *See*—
Niedospial, John J., Jr.; Robertson, Jeffrey C.; and Fraser, Mark D., 4,887,112, Cl. 354-275.000.

Freeman, Forrest F. Exhaust backpressure tester. 4,885,934, Cl. 73-115.000.

Freitag, Michael G.: *See*—
Dop, Dennis B.; Freitag, Michael G.; and Zawacki, Norbert W., 4,887,290, Cl. 379-33.000.

Fried, Kim L.: *See*—
Hendren, Gary L.; Provost, Richard L.; Fried, Kim L.; and Taylor, Leland A., 4,886,578, Cl. 162-123.000.

Friedman, Harvey S., to Digital Equipment Corporation. Thermal package for electronic components. 4,887,147, Cl. 357-74.000.

Friedrich, Hans-Helmut: *See*—
Wirth, Hermann O.; and Friedrich, Hans-Helmut, 4,886,610, Cl. 252-32.500.

Friedrich, Heinz: *See*—
Gruber, Harald; Richter, Andreas M.; Fanghanel, Egon; Roth, Hans-Klaus; Friedrich, Heinz; and Maras, Siegfried, 4,886,627, Cl. 252-513.000.

Frielinghaus, Klaus H., to General Signal Corporation. Broken rail and/or broken rail joint bar detection. 4,886,226, Cl. 246-121.000.

Frigo, Valerio: *See*—
Bonomi, Giovanni B.; Giacomini, Luigi; Bonomi, Christiano; Aresa, Carmine; and Frigo, Valerio, 4,885,836, Cl. 29-524.100.

Frommelt Industries, Inc.: *See*—
Lenz, Kenneth, 4,885,881, Cl. 52-173.0DS.

Fu, Josepha M.: *See*—
Fong, Dodd W.; and Fu, Josepha M., 4,886,872, Cl. 525-329.400.

Fuji Electric Co., Ltd.: *See*—
Hongo, Yasuo, 4,887,303, Cl. 382-34.000.

Fuji Photo Film Co., Ltd.: *See*—
Deguchi, Naoyasu; Kamei, Sadao; Goda, Kensuke; Shuto, Sadanobu; and Hayashi, Yasuhiro, 4,886,738, Cl. 430-510.000.
Fujita, Yoshihiro; Komatsuzaki, Hiroshi; Shoji, Masao; Noguchi, Yukio; Hirai, Masayoshi; and Ohno, Kazunori, 4,887,109, Cl. 354-222.000.
Hasumi, Kazuo; Watanabe, Hideomi; Okita, Tsutomu; Ryoke, Katsumi; and Kosha, Hideaki, 4,886,703, Cl. 428-323.000.
Hideshima, Takahiro, 4,887,125, Cl. 355-55.000.
Itakura, Toru, 4,886,967, Cl. 250-327.200.
Kubodera, Seiiti; and Minagawa, Nobuhiko, 4,886,775, Cl. 503-227.000.
Nakamura, Koki; Sakanoue, Kei; and Ichijima, Seiji, 4,886,736, Cl. 430-359.000.
Ohnishi, Masahiro; Ogura, Nobuhiko; and Muraishi, Katsuaki, 4,886,968, Cl. 250-327.200.
Oishi, Kengo, 4,886,220, Cl. 242-188.000.
Ozawa, Yoshio; and Shigaki, Takao, 4,886,352, Cl. 355-28.000.
Shimura, Kazuo, 4,887,305, Cl. 382-51.000.
Uchiyama, Kaoru; Ishizuka, Tetuya; and Sakamoto, Kiichiro, 4,887,116, Cl. 354-320.000.
Watanabe, Mikio; Shimanuki, Koji; and Nishi, Seiki, 4,887,161, Cl. 358-224.000.
Yoshino, Shigeru, 4,887,124, Cl. 355-32.000.

Fujibayashi, Akio: *See*—
Teramoto, Toyokazu; Fujibayashi, Akio; Fukuda, Kozo; Ueda, Mashiro; Nagahashi, Shinichi; Kataoka, Yazuru; Sato, Hiroaki; Wada, Tsunemi; Gino, Takao; Saito, Yoshio; and Morioka, Kiyotaka, 4,886,558, Cl. 148-146.000.

Fujii, Hiroshi: *See*—
Onishi, Takashi; Suzuki, Shigeaki; Mori, Toshiki; Fujii, Hiroshi; and Fujita, Yoshiji, 4,886,916, Cl. 568-34.000.

Fujii, Setsuro; Yamashita, Jun-ichi; Matsumoto, Hiroshi; Takeda, Setsuo; Terada, Tadafumi; Yasumoto, Mitsugi; and Unemi, Norio, to Taiho Pharmaceutical Company Limited. Novel 2'-deoxy-5-substituted uridine derivatives, processes for preparing the same and antitumor agent containing the same. 4,886,877, Cl. 536-23.000.

Fujiki, Hironao: *See*—
Ikeno, Masayuki; Fujiki, Hironao; and Inomata, Hiroshi, 4,886,865, Cl. 528-15.000.

Fujiki, Yuji: *See*—
Tomobe, Norio; Shimamura, Haruo; Suzuki, Kozo; Taniguchi, Yutaka; and Fujiki, Yuji, 4,886,035, Cl. 123-588.000.

Fujimori, Tohru: *See*—
Yamagishi, Youji; Akasaka, Kozo; Suzuki, Takeshi; Miyamoto, Mitsuaki; Nakamoto, Kouji; Okano, Kazuo; Abe, Shinya; Ikuta, Hironori; Hayashi, Kenji; Yoshimura, Hiroyuki; Fujimori, Tohru; Harada, Koukichi; and Yamatsu, Isao, 4,886,834, Cl. 514-521.000.

Fujimura, Takeo, to Mitsubishi Denki Kabushiki Kaisha. Display device using shadowmask CRT. 4,887,010, Cl. 315-370.000.

Fujioka, Tadashi: *See*—
Mizukami, Hideaki; Mori, Kentaro; Ozeki, Akichika; Kawawa, Takaho; Sugitani, Yuji; Nomura, Hirokazu; Fujioka, Tadashi; and Nakagawa, Hirotaka, 4,886,547, Cl. 75-0.50C.

Fujioka, Takafumi: *See*—
Tamada, Shigeharu; Fujioka, Takafumi; Ogawa, Hidenori; Teramoto, Shuji; and Kondo, Kazumi, 4,886,809, Cl. 514-312.000.

Fujioka, Yasushi: *See*—
Saito, Keishi; and Fujioka, Yasushi, 4,887,134, Cl. 357-16.000.

Fujishima, Kazuyasu: *See*—
Matsuda, Yoshio; and Fujishima, Kazuyasu, 4,887,136, Cl. 357-23.600.

Fujita, Satoshi: *See*—
Nakamura, Tadashi; Fujita, Satoshi; and Ishida, Eiichi, 4,886,135, Cl. 180-68.100.

Fujita, Yoshihiro; Komatsuzaki, Hiroshi; Shoji, Masao; Noguchi, Yukio; Hirai, Masayoshi; and Ohno, Kazunori, to Fuji Photo Film

Co. Ltd. Viewfinder for a camera with changeable focal length. 4,887,109, Cl. 354-222.000.

Fujita, Yoshiji: *See—*
Onishi, Takashi; Suzuki, Shigeaki; Mori, Toshiki; Fujii, Hiroshi; and Fujita, Yoshiji, 4,886,916, Cl. 568-34.000.

Fujita, Yoshitada; and Hanada, Sadashi, to Kawasaki Jukogyo Kabushiki Kaisha. Traversing method for long and heavy article. 4,886,414, Cl. 414-786.000.

Fujitsu Limited: *See—*
Kosugi, Toru; Furukawa, Takahiro; and Miyaou, Hirohisa, 4,887,083, Cl. 341-56.000.

Fujiwara, Masanori: *See—*
Masaki, Kenji; Osawa, Izumi; Fujiwara, Masanori; Doi, Isao; and Takedomi, Yumiko, 4,886,724, Cl. 430-66.000.

Fujiwara, Naoki: *See—*
Baba, Akira; Okiura, Kunio; and Fujiwara, Naoki, 4,885,999, Cl. 110-186.000.

Fujiwara, Takashi: *See—*
Asaka, Junichiro; Fujiwara, Tamio; Fujiwara, Takashi; Kuwajima, Goro; Kondo, Eiji; and Shin, Masaru, 4,886,748, Cl. 435-69.700.

Fujiwara, Tamio: *See—*
Asaka, Junichiro; Fujiwara, Tamio; Fujiwara, Takashi; Kuwajima, Goro; Kondo, Eiji; and Shin, Masaru, 4,886,748, Cl. 435-69.700.

Fukada, Nobuo: *See—*
Shindo, Takuji; Naito, Hiromitsu; Kondo, Masayoshi; Fukuyama, Takashi; Koizumi, Masaaki; and Fukada, Nobuo, 4,886,559, Cl. 148-421.000.

Fukaya, Chikara: *See—*
Ashimori, Atsuyuki; Ono, Taizo; Inoue, Yoshihisa; Fukaya, Chikara; and Yokoyama, Kazumasa, 4,886,819, Cl. 514-356.000.

Fukuda, Kozo: *See—*
Teramoto, Toyokazu; Fujibayashi, Akio; Fukuda, Kozo; Ueda, Mashiro; Nagahashi, Shinichi; Kataoka, Yazuru; Sato, Hiroaki; Wada, Tsunemi; Gino, Takao; Saito, Yoshio; and Morioka, Kiyotaka, 4,886,558, Cl. 148-146.000.

Fukumoto, Hiroshi: *See—*
Tanaka, Katsuhiko; and Fukumoto, Hiroshi, 4,886,725, Cl. 430-106.600.

Fukumoto, Kazumi: *See—*
Matsumura, Yasushi; Shuhara, Akira; Sasaki, Shigeo; Fukumoto, Kazumi; and Takeya, Hitoshi, 4,886,971, Cl. 250-492.200.

Fukushima, Akira: *See—*
Nakamura, Ikushi; Ootsuka, Hiroshi; Fukushima, Akira; Kudo, Yoshinobu; Hata, Yoshiaki; Inoue, Manabu; and Inoue, Norihiro, 4,887,107, Cl. 354-195.120.

Fukuyama, Takashi: *See—*
Shindo, Takuji; Naito, Hiromitsu; Kondo, Masayoshi; Fukuyama, Takashi; Koizumi, Masaaki; and Fukada, Nobuo, 4,886,559, Cl. 148-421.000.

Fulcher, Carol A.: *See—*
Zimmerman, Theodore S.; and Fulcher, Carol A., 4,886,876, Cl. 530-383.000.

Fuller, Walter D. Precision controlled cartesian diver. 4,886,459, Cl. 434-300.000.

Fumeno, Tsuyoshi: *See—*
Yanagawa, Hisaharu; Ochiai, Toshihiro; Miyazawa, Hidenisa; Yamaguchi, Shizuka; Fumeno, Tsuyoshi; Raijo, Hiroshi; and Ohmizu, Seiji, 4,886,335, Cl. 350-96.200.

Funabashi, Motohisa: *See—*
Ohnari, Mikihiko; Sekozawa, Teruji; Funabashi, Motohisa; Atago, Takeshi; and Shioya, Makoto, 4,887,216, Cl. 364-431.060.

Funayama, Osamu: *See—*
Arai, Mikiro; Funayama, Osamu; Tashiro, Yuuji; and Isoda, Takeshi, 4,886,860, Cl. 525-474.000.

Funyu, Yukio: *See—*
Noguchi, Yasuhiro; Yamada, Hitoshi; and Funyu, Yukio, 4,887,230, Cl. 364-560.000.

Furstenau, Norbert, to Versuchsanstalt fur Luft. Flat tactile sensor. 4,886,361, Cl. 356-345.000.

Furukawa Aluminum Co., Ltd.: *See—*
Coe, Thomas U., 4,887,179, Cl. 360-135.000.

Furukawa Electric Co., Ltd., The: *See—*
Nishiyama, Hidemi; and Ohtani, Kenichi, 4,886,848, Cl. 524-109.000.
Yanagawa, Hisaharu; Ochiai, Toshihiro; Miyazawa, Hidenisa; Yamaguchi, Shizuka; Fumeno, Tsuyoshi; Raijo, Hiroshi; and Ohmizu, Seiji, 4,886,335, Cl. 350-96.200.

Furukawa, Takahiro: *See—*
Kosugi, Toru; Furukawa, Takahiro; and Miyaou, Hirohisa, 4,887,083, Cl. 341-56.000.

Furuto, Yuuji: *See—*
Koshiba, Mitsunobu; Yamada, Keiichi; Harita, Yoshiyuki; Kawamura, Shin'ichi; and Furuto, Yuuji, 4,886,565, Cl. 156-345.000.

Fusion Systems Corporation: *See—*
Simpson, James E.; Kamarehi, Mohammed; and Ury, Michael G., 4,887,192, Cl. 362-265.000.
Wood, Charles H., 4,887,008, Cl. 315-39.000.

G. Rodenstock Instruments GmbH: *See—*
Reis, Werner; and Bisle, Werner, 4,887,019, Cl. 350-6.100.

Gabrlik, Zdenek; Morris, John M.; and Green, Charles J., to GT Development Corporation. Gas venting valve for liquid tank. 4,886,089, Cl. 137-202.000.

GAC International, Inc.: *See—*
Cetlin, Norman, 4,886,451, Cl. 433-7.000.

Gaddipati, Achuta R.: *See—*
Singh, Raj N.; and Gaddipati, Achuta R., 4,886,682, Cl. 427-56.100.

Gaewsky, John P., to Polaroid Corporation. Electronic flash camera having reduced cycle time. 4,887,118, Cl. 354-413.000.

GAF Corporation: *See—*
Chaudhuri, Ratan K.; Tracy, David J.; and Login, Robert B., 4,886,890, Cl. 548-519.000.
Walton, William B., 4,886,609, Cl. 252-8.552.
Woodring, William J.; and Horner, Charles J., Jr., 4,886,554, Cl. 136-244.000.

Gaffney, Thomas D.: *See—*
Molyneux, Keith W.; and Gaffney, Thomas D., 4,886,960, Cl. 250-209.000.

Gaffney, Thomas E.; and Wahlen, Patrick S., to Kohler Co. Sheet flow spout. 4,886,210, Cl. 239-193.000.

Gagnon, Claude; Gelineau, Claude; Raymond, Pierre; Krzelowski, Zygmunt P.; and Galletly, George, to Westinghouse Canada Inc. Bus duct joint. 4,886,940, Cl. 174-88.00B.

Gaiffi, Nazareno: *See—*
Fischer, Melchior; and Gaiffi, Nazareno, 4,886,645, Cl. 422-186.180.

Galbiati, Paola: *See—*
Bertotti, Franco; Cini, Carlo; Contiero, Claudio; and Galbiati, Paola, 4,887,142, Cl. 357-43.000.

Galie, Louis M.; Sedlak, Adolf; and Stotz, Gerhard, to Timex Corporation. Universal stepping motor/gear train module for a wrist instrument. 4,886,988, Cl. 310-49.00R.

Galili, Gad: *See—*
Larkins, Brian; Cuellar, Richard E.; Wallace, John C.; and Galili, Gad, 4,886,878, Cl. 536-26.000.

Galletly, George: *See—*
Gagnon, Claude; Gelineau, Claude; Raymond, Pierre; Krzelowski, Zygmunt P.; and Galletly, George, 4,886,940, Cl. 174-88.00B.

Gamache, Mark. Vehicle cover. 4,886,083, Cl. 135-88.000.

Gambro AB: *See—*
Solem, Jan O.; and Pilman, Olev, 4,886,487, Cl. 604-5.000.

Gandi, Robert A.: *See—*
Conoscenti, Craig S.; Gandi, Robert A.; Meduri, Gianfranco U.; and Ostrowski, David S., 4,886,496, Cl. 604-96.000.

Gandy, William E., Jr.: *See—*
Boland, Bernard W.; Gandy, William E., Jr.; and Jackson, Kevin B, 4,886,762, Cl. 437-15.000.

Gardner, Kenneth: *See—*
Hunt, Rowland D.; and Gardner, Kenneth, 4,885,877, Cl. 52-2.000.

Gardner, Peter D., to United States of America, Air Force. P-I-N photodetector having a burried junction. 4,887,138, Cl. 357-30.000.

Garner, Harrison A., Jr.; Hemphill, Raymond M.; McGraw, John F.; Schmidt, Michael L.; Smith, Bruce A.; and Wert, David E., to Carpenter Technology Corporation. Hot work tool steel with good temper resistance. 4,886,640, Cl. 420-111.000.

Garner, Terry N.; and Dixon, Robert P., to General Electric Company. Radio with options board. 4,887,311, Cl. 455-76.000.

Garrett, James R., to Executive Technical Services, Inc. Aircraft instrument illuminating apparatus. 4,887,189, Cl. 362-23.000.

Garrison, Clarence M. Natural gas production apparatus with bottomhole separator. 4,886,116, Cl. 166-105.500.

Gartner, Robert F., to Honeywell Inc. Projectile with spin chambers. 4,886,223, Cl. 244-3.230.

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Gas Research Institute: *See—*
Lambert, John E., 4,886,034, Cl. 123-587.000.

Gasper, Kenneth E.; and Vella, Philip A., to Olin corporation. Process and apparatus for producing an aqueous solution containing chlorine dioxide and chlorine. 4,886,653, Cl. 423-478.000.

Gasser, Joachim, to Refeka Werbemittel GmbH. Folding card. 4,885,859, Cl. 40-539.000.

Gates Rubber Company, The: *See—*
Davis, Edward H.; Klaes, Gerald F.; Harris, Jack L.; and Douglass, Paul L., 4,885,928, Cl. 72-410.000.

Gatti, Maria T.: *See—*
Bertotti, Franco; Ferrari, Paolo; and Gatti, Maria T., 4,887,141, Cl. 357-36.000.

Gaudenzi, Renzo: *See—*
Re Fiorentin, Stefano; and Gaudenzi, Renzo, 4,887,025, Cl. 324-65.00R.

Gaudino, Larry J., to Technitrol, Inc. Method of controlling the pore morphology of strengthened silver powder compacts. 4,886,636, Cl. 419-2.000.

Gavin, Lawrence R.: *See—*
Doherty, Paul D.; Tackett, Timothy N.; and Gavin, Lawrence R., 4,886,466, Cl. 439-191.000.

Gay, Frank P.; Logullo, Francis M.; Luise, Robert R.; and Mack, Mark P., to Du Pont de Nemours, E. I., and Company. End-capping of polyarylate carboxyl acid ends by use of aromatic carbonates. 4,886,875, Cl. 525-439.000.

Gayer, Herbert; Jelich, Klaus; Lunkenheimer, Winfried; Brandes, Wilhelm; and Hanssler, Gerd, to Bayer Aktiengesellschaft. 2-cyano-2-alkoximino-acetamides. 4,886,833, Cl. 514-521.000.

Gazalski, Richard S. Standing goose decoy. 4,885,861, Cl. 43-3.000.

Gebroeders Rock Beheer B.V.: *See—*
Rook, Cornelis; and Klein, Willem, 4,886,633, Cl. 264-219.000.

Geelhaar, Thomas: *See—*
Hopf, Reinhard; Scheuble, Bernhard; Wachtler, Andreas; Hittich, Reinhard; Eidenschink, Rudolf; Geelhaar, Thomas; Krause, Joachim; and Reiffenrath, Volker, 4,886,620, Cl. 252-299.610.

Gelain, Silvano, to Ransburg-Gema AG. Powder coating apparatus. 4,886,011, Cl. 118-308.000.

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GenCorp Inc.: *See—*
Simmons, Robert W.; Stamper, Richard W.; and Kaufman, Thomas P., 4,885,887, Cl. 52-410.000.

Genentech, Inc.: *See—*
Derynck, Rik M. A.; and Goeddel, David V., 4,886,747, Cl. 435-69.400.

General Electric Company: *See—*
Bessler, Warren F., 4,886,042, Cl. 126-21.00R.
Garner, Terry N.; and Dixon, Robert P., 4,887,311, Cl. 455-76.000.
Harton, Lynn M.; Rosenberger, Bruce R.; Anderson, John D.; and Walker, Clarence W., 4,886,468, Cl. 439-212.000.
O'Donnell, Matthew, 4,886,069, Cl. 128-661.010.
Roemer, Peter B.; Edelstein, William A.; Hayes, Cecil E.; and Eash, Matthew G., 4,887,039, Cl. 324-322.000.
Singh, Raj N.; and Gaddipati, Achuta R., 4,886,682, Cl. 427-56.100.

General Foods Corporation: *See—*
Willey, Monroe J.; and Evert, Daniel D., 4,886,170, Cl. 206-609.000.

General Motor Corporation: *See—*
Reddy, S. Raghuma, 4,886,096, Cl. 141-45.000.

General Motors Corporation: *See—*
Bitter, Rudolf; and Senff, Gunter, 4,886,020, Cl. 123-52.00M.
Brittin, Craig E., 4,886,449, Cl. 432-121.000.
Browne, Alan L., 4,886,295, Cl. 280-777.000.
Copp, Douglas M., 4,886,146, Cl. 188-2.00D.
Corkin, William R.; and Bedi, Ram D., 4,885,927, Cl. 72-342.000.
Cyr, Richard A.; and Raley, Ronald J., 4,886,310, Cl. 292-336.300.
Doherty, Paul D.; Tackett, Timothy N.; and Gavin, Lawrence R., 4,886,466, Cl. 439-191.000.
Duce, Richard W., 4,885,992, Cl. 101-38.100.
Foldvary, Leslie A., 4,886,711, Cl. 428-592.000.
Germ, Kenneth B., 4,886,473, Cl. 439-847.000.
Graber, David W.; Pawlak, Andrzej M.; and Zuraski, Jeffery A., 4,886,138, Cl. 180-142.000.
Jandeska, William F., Jr.; Rezhets, Vadim; and Ligotti, Carlo, 4,886,637, Cl. 419-12.000.
Langdon, Roger M.; and Smith, Cyril, 4,887,033, Cl. 324-253.000.
Lun, Saiman, 4,886,253, Cl. 267-140.100.
Miller, James W., 4,886,085, Cl. 137-1.000.
Nies, David L.; and Shroyer, Tomas L., 4,886,319, Cl. 303-9.750.
Olgren, Leland N., 4,886,460, Cl. 439-15.000.
Orrell, William B.; and Creps, Wendell D., 4,886,027, Cl. 123-478.000.
Pawlak, Andrzej M.; Graber, David W.; and Zuraski, Jeffery A., 4,886,137, Cl. 180-142.000.
Williams, Jerry K., 4,885,827, Cl. 29-91.100.
Yamamoto, Mayjue A., 4,886,134, Cl. 188-20.000.

General Signal Corporation: *See—*
Ben-Dov, Oded, 4,885,839, Cl. 29-600.000.
Frielinghaus, Klaus H., 4,886,226, Cl. 246-121.000.
Roettger, William J., 4,885,981, Cl. 92-59.000.

General Transervice, Inc.: *See—*
Wilkinson, Michael J.; Watkins, Robert G., Jr.; and Sell, Edward A., 4,886,282, Cl. 280-4.000.

Gepjarmu Javito Kisszovetkezet: *See—*
Nemeth, Istvan; Simon, Bela; and Nemeth, Istvan, 4,885,846, Cl. 33-203.130.

Germ, Kenneth B., to General Motors Corporation. Ignition terminal assembly. 4,886,473, Cl. 439-847.000.

Gerutti, Richard L.; Haskins, David R.; Heithoff, Robert B.; Schwenninger, Ronald L.; and Welton, Wright M., to PPG Industries, Inc. Method of vacuum refining of glassy materials with selenium foaming agent. 4,886,539, Cl. 65-135.000.

Gerwick, Ben C., III: *See—*
Kleschick, William A.; Ehr, Robert J.; Costales, Mark J.; Gerwick, Ben C., III; Meikle, Richard W., deceased; Monte, William T.; and Pearson, Norman R., 4,886,883, Cl. 544-263.000.

Giacomini, Luigi: *See—*
Bonomi, Giovanni B.; Giacomini, Luigi; Bonomi, Christiano; Aresa, Carmine; and Frigo, Valerio, 4,885,836, Cl. 29-524.100.

Gibbs & Hill, Inc.: *See—*
Nakhamkin, Michael, 4,885,912, Cl. 60-652.000.

Gibbs, Robert W. Device for destroying bacteria. 4,886,593, Cl. 204-302.000.

Gicquiaux, Yvon G. A. J. M.: *See—*
de Baynast de Septfontaines, Regis J. M. P.; Brouard, Francois E. M. E.; Baret, Jean-Luc A. G.; Gicquiaux, Yvon G. A. J. M.; and Olsen, Hans S., 4,886,672, Cl. 426-48.000.

Gilbert, Leslie C.; and Rushlow, Leo M. J. Cigarette snuffer. 4,886,076, Cl. 131-256.000.

Gillich, Thomas N., to Hoechst Celanese Corporation. Cleaner for lithographic printing plates. 4,886,553, Cl. 134-42.000.

Gilliland, Malcolm T. Apparatus for linearizing the output of an amplifier without using feedback. 4,887,046, Cl. 330-252.000.

Gimson, Christopher J., to Mestra A.G. Capacitive sensor and circuit for detecting contamination of guard electrode. 4,887,023, Cl. 324-61.00R.

Gin, Jerry B.: *See—*
Ingalz, Thomas J.; Gin, Jerry B.; and Wong, Vernon G., 4,886,066, Cl. 128-645.000.

Gino, Takao: *See—*
Teramoto, Toyokazu; Fujibayashi, Akio; Fukuda, Kozo; Ueda, Mashiro; Nagahashi, Shinichi; Kataoka, Yazuru; Sato, Hiroaki; Wada, Tsunemi; Gino, Takao; Saito, Yoshio; and Morioka, Kiyotaka, 4,886,558, Cl. 148-146.000.

Giorgetti, Alberto; and Lavezzi, Roberto, to Brembo S.p.A. Antiskid device useful in a brake system of a motorvehicle. 4,886,323, Cl. 303-113.000.

Giorgi, Leonardo: *See—*
Azzerri, Nazzareno; and Giorgi, Leonardo, 4,886,712, Cl. 428-632.000.

Giorgi, Raffaello; Conti, Marisa; and Pifferi, Giorgio, to Inverni della Beffa S.p.A. Soluble derivatives of silybin, a method of preparing them, and pharmaceutical compositions containing them. 4,886,791, Cl. 514-100.000.

Gipson, Kirk P.: *See—*
Haynie, Carl R.; Gipson, Kirk P.; and Nichols, Gary H., 4,887,011, Cl. 315-403.000.

Gist-Brocades N.V.: *See—*
Bertola, Mauro A.; Marx, Arthur F.; Koger, Hein S.; Quax, Wilhelmus J.; Van der Laken, Cornelis J.; Phillips, Gareth T.; Robertson, Brian W.; and Watts, Peter D., 4,886,750, Cl. 435-136.000.

Giusti, Frank, Jr.: *See—*
Ross, Colby M.; Giusti, Frank, Jr.; and Hendrickson, James D., 4,886,113, Cl. 166-51.000.

Glaberson, John; and Santulli, Scott, to Cauzin Systems, Incorporated. Card reader for receiving a card bearing an imprinted data strip, self positioning the card in a pre-determined position and scanning the imprinted data strip in two directions. 4,886,957, Cl. 235-482.000.

Glasstech International L.P.: *See—*
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Gleisner Klempau, Arturo G.: *See—*
Saphores Wiedmaier, Eugenio A.; Gleisner Klempau, Arturo G.; Vega de Kuyper, Juan C.; and Mardones Parra, Wladimir A., 4,886,595, Cl. 209-166.000.

Glorvigen, Bradley W.: *See—*
Tuominen, Francis W.; Swanson, Ronald R.; Mattison, Phillip L.; MacKay, Kenneth D.; and Glorvigen, Bradley W., 4,886,888, Cl. 548-497.000.

Glover, Alfred H.: *See—*
Betterton, Joseph T.; Glover, Alfred H.; McKee, Thomas S.; and Romanczuk, Chris S., 4,886,033, Cl. 123-574.000.

Go, Mutsukazu: *See—*
Shinjo, Kinichi; and Go, Mutsukazu, 4,885,959, Cl. 74-801.000.

Goble, Ralph W. Mill for pulverizing rock and other material. 4,886,216, Cl. 241-152.00R.

Gockel, Ulrich: *See—*
Denzinger, Walter; Hartmann, Heinrich; Gockel, Ulrich; Richter, Felix; Raubenheimer, Hans-Jurgen; and Winkler, Ekhard, 4,886,859, Cl. 525-327.800.

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Deguchi, Naoyasu; Kamei, Sadao; Goda, Kensuke; Shuto, Sadanobu; and Hayashi, Yasuhiro, 4,886,738, Cl. 430-510.000.

Godard, Dominique: *See—*
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Belloc, Jacques; Godard, Dominique; Morlec, Emile; and Quintin, Michel, 4,887,258, Cl. 370-32.100.

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Goeddel, David V.: *See—*
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Goex, Inc.: *See—*
Hancock, Michael P.; and Hayes, Scott L., 4,885,993, Cl. 102-307.000.

Gofuku, Ihachiro; Osada, Yoshiyuki; and Nakagawa, Katsumi, to Canon Kabushiki Kaisha. Method for driving a photo-sensor by applying a pulse voltage to an auxiliary electrode during a non-read time. 4,886,962, Cl. 250-211.00J.

Gofuku, Ihachiro; Osada, Yoshiyuki; Nakagawa, Katsumi; Hatanaka, Katsunori; Saika, Toshihiro; and Kaifu, Noriyuki, to Canon Kabushiki Kaisha. Photoelectric converter provided with voltage dividing means. 4,886,977, Cl. 250-578.000.

Goldberg, Ronald N.; Mavroudis, Eugene G.; and Ferguson, Susan H., to Estee Lauder, Inc. Cosmetic container and applicator. 4,886,387, Cl. 401-122.000.

Gondar, Robert K.; and Jacobs, Philip J., to United Technologies Corporation. Composite tool having wear indicator. 4,886,009, Cl. 116-208.000.

Gonella, Mario: *See—*
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Gontowski, Walter S., to Cherry Semiconductor Corporation. Under voltage lockout circuit for switching mode power supply. 4,887,022, Cl. 323-284.000.

Good, Michael A.; Berzofsky, Jay; and Miller, Louis H., to United States of America, Health and Human Services. Malarial immunogen. 4,886,782, Cl. 514-12.000.

Goodard, Dan J.: *See—*
Carpenter, Brent, 4,885,808, Cl. 2-452.000.

Gooding, P. G. Composite beams. 4,885,892, Cl. 52-690.000.
Goodman, Alan S.: *See*—
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Goodrich, Lawrence D.: *See*—
Anschel, Morris; Goodrich, Lawrence D.; and Hetrick, Barton M., 4,886,727, Cl. 430-311.000.
Goralski, Christian T.; Singaram, Bakthan; and Brown, Herbert C., to Dow Chemical Company, The. Stereospecific synthesis of [E]-alkenes from enamines via hydroboration. 4,886,924, Cl. 585-318.000.
Gordon, Anthony J.: *See*—
Forrest, Alexander; and Gordon, Anthony J., 4,886,440, Cl. 425-208.000.
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Goss, Charles T., 4,886,447, Cl. 431-353.000.
Goto, Hiroyuki: *See*—
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Goto, Yasuhiro; Yonezawa, Takeyuki; and Ohnuma, Yoshiyuki, to Kabushiki Kaisha Toshiba. Silicon nitride-ceramic and a manufacturing method therof. 4,886,767, Cl. 501-97.000.
Goto, Yukihisa: *See*—
Yagihara, Hiroshi; Goto, Yukihisa; Masamoto, Kazuhisa; Morishima, Yasuo; and Osabe, Hirokazu, 4,886,546, Cl. 71-88.000.
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Gottlieb, Milton; and Melamed, Nathan T., to Westinghouse Electric Corp. Method and apparatus for improving the angular aperture of an aodlf. 4,886,346, Cl. 350-358.000.
Gottschling, Reinhard, to Migua Hammerschmidt GmbH. Joint bridging device. 4,885,885, Cl. 52-396.000.
Goulter, Victor H. Coil for storing used plasatic grocery bags. 4,886,173, Cl. 211-89.000.
Graber, David W.; Pawlak, Andrzej M.; and Zuraski, Jeffery A., to General Motors Corporation. Electromagnetic control apparatus for varying the driver steering effort of a hydraulic power steering system. 4,886,138, Cl. 180-142.000.
Graber, David W.: *See*—
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Graco, Inc.: *See*—
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Gradeff, Peter S.; and Ramirez, Carlos, to Rhone-Poulenc, Inc. Colloidal alcohol-dispersible association complexes of ceric dioxide and a hydroxyphenyl carboxylic acid. 4,886,624, Cl. 252-308.000.
Graf, Hans-Juergen, to Air Products and Chemicals, Inc. Method and apparatus for packaging, shipping and using poisonous liquids. 4,886,178, Cl. 215-247.000.
Graham Engineering Corporation: *See*—
Klinedinst, Paul W.; and Smeltzer, Thomas, 4,886,443, Cl. 425-537.000.
Graham, Gary R., to U.S. Philips Corporation. Self-compensating brushless alternator. 4,887,020, Cl. 322-63.000.
Graham, Richard S.; Yoneda, Yuko; and Young, Frank E., to University of Rochester, The. Recombinant bateriophage for heterologous cloning of bacillus microorganisms and method for its production. 4,886,754, Cl. 435-172.300.
Grain Systems, Incorporated: *See*—
Pollock, Eugene B., 4,885,985, Cl. 98-55.000.
Grandy, Clarence E. Multikey carrier. 4,886,159, Cl. 206-37.400.
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Grasselli, Robert K.: *See*—
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Grassens, Leonardus J.: *See*—
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Green Cross Corporation, The: *See*—
Ashimori, Atsuyuki; Ono, Taizo; Inoue, Yoshihisa; Fukaya, Chikara; and Yokoyama, Kazumasa, 4,886,819, Cl. 514-356.000.
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Greengrass, Michael; and Allen, Anthony L. Controlled ripening of produce and fruits. 4,886,372, Cl. 383-100.000.
Greenland, Harry: *See*—
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Gresham, Gerald L. Tie down apparatus for wheelchair. 4,886,403, Cl. 410-10.000.
Griebeler, Elmer L., to Cleveland Machine Controls, Inc. Electrostatic transducer and method of making and using same. 4,887,248, Cl. 367-181.000.
Griffin, John F. T., to University of Otago, The. Method of detecting infection or immunity in ruminants. 4,886,655, Cl. 424-2.000.
Grimm, Ekkehard; and Todteberg, Eckhard, to Heraeus Sepatech GmbH. Centrifuge equipped with a rotor. 4,886,486, Cl. 494-20.000.
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Griss, Gerhart, deceased (by Griss, Elisabeth, legal representative); Schneider, Claus; Hurnaus, Rudolf; Kobinger, Walter; Pichler, Ludwig; Bauer, Rudolf; Mierau, Joachim; Hinzen, Dieter; and Schingnitz, Gunter, to Dr. Karl Thomae GmbH. Tetrahydro-benzthiazoles, the preparation thereof and their use as intermediate products or as pharmaceuticals. 4,886,812, Cl. 514-321.000.
Gross, Mario, to Robot Foto und Electronic GmbH U. Co. KG. Stationary traffic monitoring device. 4,887,080, Cl. 340-937.000.
Gross, Rainer; and Schramm, Matthias, to Bayer Aktiengesellschaft. Dihydropyridine combination product comprising a dihydropyridine compound and a cardioactive nitrate. 4,886,820, Cl. 514-356.000.
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Grossi, Lucio. Automatic compact machine for the production of coffee and infusions, especially for domestic use. 4,885,986, Cl. 99-289.00R.
Grozinger, Karl G.; and Oliver, James T., to Boehringer Ingelheim Pharmaceuticals Inc. Diazine-ethenylphenyl oxamic acids and esters and salts thereof. 4,886,801, Cl. 514-247.000.
Gruber, Harald; Richter, Andreas M.; Fanghanel, Egon; Roth, Hans-Klaus; Friedrich, Heinz; and Maras, Siegfried, to VEB Metallurgieelektronik Leipzig. Conductive structures in polymers. 4,886,627, Cl. 252-513.000.
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Gryouda, Toshio; Inaba, Shouichi; Watanabe, Michio; and Yamaguchi, Kanemichi, to Toyo Seikan Kaisha, Limited. Method of making hermetically sealed container. 4,885,897, Cl. 53-407.000.
Gsell, Thomas C.; Salinaro, Richard F.; and Degen, Peter J., to Pall Corporation. Activated medium with low non-specific protein adsorption. 4,886,836, Cl. 521-53.000.
GT Development Corporation: *See*—
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Testi, Termano; and Merli, Gabriele, 4,887,043, Cl. 328-155.000.
Gudmundsson, Bjoern J. Snow removal apparatus and method. 4,885,852, Cl. 37-260.000.
Guichard, Jacques; and Eude, Gerard. Sound and image transmission system. 4,887,158, Cl. 358-143.000.
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Gulker, Stuart P.; and Gulker, Stanley. Cleanser dispensing sponge system. 4,886,388, Cl. 401-148.000.

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Hackstein, Karl-Gerhard; and Hezel, Rudolf, to Nukem GmbH. Solar cell. 4,886,555, Cl. 136-255.000.

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Haensch, Egon, to Feraf AG. Method and apparatus for receiving printed products from a revolvingly driven bucket wheel of a printing machine. 4,886,264, Cl. 271-229.000.

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Hager, Francis M.: *See*—
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Haggiage, Johnny: *See*—
Cyprien Guy; Fisch, Alain; Haggiage, Johnny; Porte, Hugues; Prazuck, Thierry; and Torres, Ghislaine, 4,886,661, Cl. 424-78.000.

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Clabes, Joachim G.; Hahn, Peter O.; Ho, Paul S.; Lefakis, Haralambos; and Rubloff, Gary W., 4,886,681, Cl. 427-38.000.

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Bragg, Dale E.; Clark, Mark A.; and Fleming, Randy G., 4,886,367, Cl. 366-132.000.

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Wally, Joseph H., Jr.; Pace, Herbert W.; and Halsey, Ronald L., 4,887,123, Cl. 355-30.000.

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Chamourian, Arto, 4,886,184, Cl. 220-306.000.

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Hanes, David A., to Litens Automotive Partnership. Torsional spring tensioner with stabilizer. 4,886,484, Cl. 474-135.000.

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Perdelwitz, Lee E., Jr; Young, Robert H.; Iff, Ron H.; Hanke, David E.; Allison, Kathleen S.; Rahkonen, Raimo K.; and Neogi, Amar N., 4,886,697, Cl. 428-192.000.

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Keidar, Itzhak; Dromi, Asher; Tilman, Menahem; and Harel, Joseph, 4,886,161, Cl. 206-246.000.

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Harper, Kenneth: *See*—
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Popek, Marc H., 4,886,345, Cl. 350-355.000.

Harris, Jack L.: *See*—
Davis, Edward H.; Klaes, Gerald F.; Harris, Jack L.; and Douglass, Paul L., 4,885,928, Cl. 72-410.000.

Harry, Alan, to Francotyp-Postalia GmbH. Ribbon cassettes. 4,886,384, Cl. 400-223.000.

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Harvey, Donald M., to Eastman Kodak Company. Film cassette. 4,887,110, Cl. 354-275.000.

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Hashimoto, Kiyokazu, to NEC Corporation. Non-volatile semiconductor memory device having means to latch the input data bits for controlling the drain and gate voltages of memory cell transistors. 4,887,242, Cl. 365-238.500.

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Shimada, Tomoyuki; Sasaki, Masaomi; and Hashimoto, Mitsuru, 4,886,846, Cl. 523-453.000.

Hashimoto, Toshio; and Nakafuji, Minoru, to Showa Precision Machinery Co., Ltd. Polishing robot and polishing method using the same. 4,886,529, Cl. 51-165.710.

Haskins, David R.: *See*—
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Haslam, John L.; and Rork, Gerald S., to Merck & Co., Inc. Multiparticulate controlled porosity osmotic pump. 4,886,668, Cl. 424-424.000.

Hasumi, Kazuo; Watanabe, Hideomi; Okita, Tsutomu; Ryoke, Katsumi; and Kosha, Hideaki, to Fuji Photo Film Co., Ltd. Magnetic recording medium. 4,886,703, Cl. 428-323.000.

Hata, Yoshiaki: *See*—
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Hayakawa, Toshiro; Suyama, Takahiro; Takahashi, Kosei; and Kondo, Masafumi, to Sharp Kabushiki Kaisha. Deterioration-resistant superlattice semiconductor laser device. 4,887,274, Cl. 372-45.000.

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Hayes, Michael E.; Hrebenar, Kevin R.; Minor, Jennifer L.; and Woodworth, Lawrence M., to Petroleum Fermentations N.V. Method for reducing sox emissions during the combustion of sulfur-containing combustible compositions. 4,886,519, Cl. 44-51.000.

Hayes, Michael E., to Union Camp Corporation. Polyamide resin dispersions and method for the manufacture thereof. 4,886,844, Cl. 523-223.000.

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Hayes, Richard H., to Eagle-Picher Industries, Inc. Automatic load-wheel cleaner. 4,885,936, Cl. 73-146.000.

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Hebisch, Siegfried: *See*—
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Hecox, Kurt E.: *See*—
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Heffernan, Mary B.; Norton, Kenneth A.; and Cowger, Bruce, to Hewlett-Packard Company. Determination of cleanliness level of foam reservoir. 4,885,932, Cl. 73-53.000.

Hehl, Karl. Openable and closeable nozzle for the plasticizing cylinder of an injection molding machine. 4,886,439, Cl. 425-190.000.

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Heilen, Wernfried: *See*—
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Hein-Werner Corporation: *See*—
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Heinemann Electric Company: *See*—
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Heinrich, Rolf: *See*—
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Heithoff, Robert B.: *See*—
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Helmstetter, John G., to Core-Guard Industries, Inc. Fireproofing of building materials. 4,886,548, Cl. 106-18.120.

Hemminger, Rodney C., to Westinghouse Electric Corp. Mutual inductance current transducer, method of making and electric energy meter incorporating same. 4,887,029, Cl. 324-142.000.

Hemphill, John M.; and Nute, Ernest B., Jr., to Armstrong World Industries, Inc. Grid accent and ceiling boards. 4,885,889, Cl. 52-484.000.

Hemphill, Raymond M.: *See*—
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Henderson, Dewey D., to Dayco Products, Inc. Belt tensioner and method of making the same. 4,886,483, Cl. 474-135.000.

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Hendren, Gary L.; Provost, Richard L.; Fried, Kim L.; and Taylor, Leland A., to Du Pont de Nemours, E. I., and Company. High heat resistant oil-impregnatable electrical insulating board. 4,886,578, Cl. 162-123.000.

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Henkel Corporation: *See*—
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Herb, Armin, to Hilti Aktiengesellschaft. Anchor bolt and expansion wedge. 4,886,406, Cl. 411-78.000.
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Herve, Philip, to Eparco. All-purpose septic tank. 4,886,605, Cl. 210-170.000.
Herzog, Kenneth. Adjustable nozzle spacer. 4,886,098, Cl. 141-368.000.
Herzog, Kenneth J. Cap alternator. 4,885,894, Cl. 53-68.000.
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Hetrick, Robert E., to Ford Motor Company. Resonant vibrating structure with electrically driven wire coil and vibration sensor. 4,887,032, Cl. 324-207.000.
Heuss, Helmut, to Ruhrgas Aktiengesellschaft. Cooled tubular assembly for industrial reheating furnace. 4,886,450, Cl. 432-235.000.
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Hicks, John W. Fiber laser sensor. 4,886,333, Cl. 350-96.150.
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Hiestand, Everett N.; and Balog, Stephen, to Upjohn Company, The. Hardness impact tester. 4,885,933, Cl. 73-79.000.
Higaki, Yuzo; Goto, Hiroyuki; and Tanikawa, Keiichi, to Nisshin Oil Mills, Ltd., The; and Nippon Steel Corporation. Lubricating oil. 4,886,612, Cl. 252-49.500.
Higashi, Robert E., to Honeywell Inc. Flowmeter fluid composition correction. 4,885,938, Cl. 73-204.180.
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Iio, Masahiro, to Diesel Kiki Co., Ltd. Press-fit structure of a shaft. 4,886,392, Cl. 403-282.000.

Iizuka, Yo: *See—*
Satake, Yoshikatsu; Kaneko, Takashi; Kobayashi, Yutaka; Iizuka, Yo; Katto, Takayuki; and Shiiki, Zenya, 4,886,871, Cl. 528-226.000.

Ikeda Bussan Co., Ltd.: *See—*
Sugiura, Takashi; Matsuura, Ichiro; Miyauchi, Fumio; and Chiyoshi, Toyoharu, 4,886,630, Cl. 264-46.600.

Ikeda, Hayato; Kawamura, Hisato; and Ishihara, Shinichi, to Kabushiki Kaisha Toyoda Jidoshokki Seisakusho. Multi-piston swash plate type compressor with damping arrangement for discharge reed valves. 4,886,424, Cl. 417-269.000.

Ikeda, Kunihiko; Suzuki, Shigeru; Yokota, Takashi; Shimura, Akira; Kodama, Yutaka; Yamazaki, Shigeru; Niro, Masaichi; and Tomita, Satoru, to Ricoh Company, Ltd. Printer. 4,887,133, Cl. 355-321.000.

Ikeda, Satoshi: *See—*
Yamasoe, Katsuyoshi; Yasuhara, Kiyotado; and Ikeda, Satoshi, 4,886,616, Cl. 252-142.000.

Ikeda, Yasuhiro; and Mizuishi, Kouji, to Shin-Etsu Handotai Co., Ltd. Supporting apparatus for semiconductor crystal rod. 4,886,647, Cl. 422-250.000.

Ikegami, Hiroshi; Muto, Tetsuji; Hamada, Tetsuro; Masuda, Katsuhiko; Shimada, Kazuhiko; and Shibuya, Kazunori, to Honda Giken Kogyo Kabushiki Kaisha. Four wheel drive vehicle. 4,886,141, Cl. 180-233.000.

Ikegami, Kazunori: *See—*
Yamane, Hisakazu; Ishida, Ritsuo; Nakanishi, Hisao; Yanai, Keiji; Toshiyasu, Masayuki; Ikegami, Kazunori; Okuda, Soichiro; Kimura, Kenji; Ishibata, Koji; and Ishii, Yoshinori, 4,886,999, Cl. 313-414.000.

Ikekawa, Nobuo: *See—*
Hayashi, Sei-ichi; Hohjoh, Tadashi; Shida, Atsuhiko; and Ikekawa, Nobuo, 4,886,544, Cl. 71-88.000.

Ikenaga, Yukio; and Yamawaki, Masami, to Polyplastics Company, Ltd. Polyacetal resin composition. 4,886,851, Cl. 524-425.000.

Ikeno, Masahiko; Kawashima, Hiroshi; and Kaneda, Osamu, to Mitsubishi Denki Kabushiki Kaisha. Spin coating apparatus. 4,886,012, Cl. 118-667.000.

Ikeno, Masayuki; Fujiki, Hironao; and Inomata, Hiroshi, to Shin-Etsu Chemical Co., Ltd. Organopolysiloxane composition. 4,886,865, Cl. 528-15.000.

Ikuta, Hironori: *See—*
Yamagishi, Youji; Akasaka, Kozo; Suzuki, Takeshi; Miyamoto, Mitsuaki; Nakamoto, Kouji; Okano, Kazuo; Abe, Shinya; Ikuta, Hironori; Hayashi, Kenji; Yoshimura, Hiroyuki; Fujimori, Tohru; Harada, Koukichi; and Yamatsu, Isao, 4,886,834, Cl. 514-521.000.

Imai, Nobuhiro; and Asano, Fumio, to Canon Kabushiki Kaisha. Image forming apparatus and developing device thereof. 4,887,103, Cl. 346-160.100.

Imai, Tamotsu; and Schmidt, Robert J., to UOP. Hydrocarbon dehydrogenation process. 4,886,928, Cl. 585-660.000.

Imanaka, Asaji; and Nagata, Kazutaka, to Nippon Air Brake Co., Ltd. Vital pressure regulating system for railroad cars. 4,886,320, Cl. 303-11.000.

IMI Engineering, Co.: *See—*
Wasterval, Philip W., Jr.; and Armstrong, James E., 4,885,893, Cl. 52-745.000.

Immuno Aktiengesellschaft fur Chemisch-Medizinische Produkte: *See—*
Eibl, Johann; Linnau, Yendra; and Schwarz, Otto, 4,886,758, Cl. 435-269.000.

Imperial Chemical Industries PLC: *See—*
Purdy, John R., 4,886,698, Cl. 428-213.000.
Vadgama, Pankaj M., 4,886,740, Cl. 435-4.000.
Walton, Ian G., 4,886,843, Cl. 522-174.000.

IMTA: *See—*
Bonomi, Giovanni B.; Giacomini, Luigi; Bonomi, Christiano; Aresa, Carmine; and Frigo, Valerio, 4,885,836, Cl. 29-524.100.

Imuta, Junichi: *See—*
Tan, Hiroaki; Kato, Koji; Imuta, Junichi; and Kihara, Noriaki, 4,886,910, Cl. 564-215.000.

In Focis Devices Inc.: *See—*
Sadamune, Dean J.; and Fagen, Shawn J., 4,887,190, Cl. 362-32.000.
Ina, Hideki, to Canon Kabushiki Kaisha. Mark detecting device for detecting the center of a mark by detecting its edges. 4,886,974, Cl. 250-561.000.
INA Walzlager Schaeffler KG: *See—*
Koschmieder, Hartmut; and Petri, Werner, 4,886,482, Cl. 474-133.000.
Inaba, Shouichi: *See—*
Gryouda, Toshio; Inaba, Shouichi; Watanabe, Michio; and Yamaguchi, Kanemichi, 4,885,897, Cl. 53-407.000.
Inagaki, Mitsuo: *See—*
Iwanami, Shigeki; Inagaki, Mitsuo; Sasaya, Hideaki; Tanaka, Taro; and Kojima, Akikazu, 4,886,423, Cl. 417-222.000.
Inage, Masaru: *See—*
Takeda, Mikio; Inage, Masaru; Wada, Hiroshi; Tamaki, Hajime; and Ochiai, Takashi, 4,886,817, Cl. 514-341.000.
Inai, Masatoshi: *See—*
Nakamura, Shizuo; Inoue, Makoto; Inai, Masatoshi; and Tsuda, Yoshiaki, 4,886,813, Cl. 514-326.000.
Inami, Yasuhiko: *See—*
Tanaka, Nobuyuki; Inami, Yasuhiko; Hijikigawa, Masaya; and Kataoka, Shoei, 4,885,937, Cl. 73-189.000.
Inari, Masato: *See—*
Tanaka, Toru; and Inari, Masato, 4,886,906, Cl. 562-416.000.
Inbar, Shai: *See—*
Arnost, Michael J.; Inbar, Shai; Meneghini, Frank A.; Palumbo, Paul S.; Stroud, Stephen G.; and Zepp, Charles M., 4,886,744, Cl. 435-6.000.
Industrial Technology Research Institute: *See—*
Ruey-Guang, Wu, 4,887,294, Cl. 379-355.000.
Industrial Tools, Inc.: *See—*
Nielsen, Christian M.; and Bolton, James C., 4,885,964, Cl. 83-56.000.
Ingalz, Thomas J.; Gin, Jerry B.; and Wong, Vernon G., to See Care Corporation. Tonometer having acoustic coupling detection. 4,886,066, Cl. 128-645.000.
Inland Steel & Forgings Ltd.: *See—*
Penner, Jacob, 4,886,409, Cl. 414-24.600.
Inline Plastics Corporation: *See—*
Kalmanides, Danny, 4,886,204, Cl. 229-2.50R.
Innovation Sports, Inc.: *See—*
Castillo, Edward L.; Castillo, James D.; and Castillo, Michael S., 4,886,054, Cl. 128-80.00F.
Inomata, Hiroshi: *See—*
Ikeno, Masayuki; Fujiki, Hironao; and Inomata, Hiroshi, 4,886,865, Cl. 528-15.000.
Inoue, Akihiro: *See—*
Dobashi, Yoshitomi; and Inoue, Akihiro, 4,887,002, Cl. 313-607.000.
Inoue, Hiromichi: *See—*
Miyazawa, Kazutoshi; Inukai, Takashi; Inoue, Hiromichi; Saito, Shinichi; and Ohno, Kouji, 4,886,622, Cl. 252-299.610.
Inoue, Kenji: *See—*
Matsuzaki, Atsushi; Kobayashi, Hiroyuki; Tomita, Hideo; Kikuchi, Kenichi; Inoue, Kenji; Kondo, Yoshiyuki; Hirayasu, Masatoshi; and Ichise, Atsushi, 4,887,152, Cl. 358-86.000.
Inoue, Makoto: *See—*
Nakamura, Shizuo; Inoue, Makoto; Inai, Masatoshi; and Tsuda, Yoshiaki, 4,886,813, Cl. 514-326.000.
Inoue, Manabu; Taniguchi, Nobuyaki; Hata, Yoshiaki; Hoda, Takeo; Kudo, Yoshinobu; and Ueda, Hiroshi, to Minolta Camera Kabushiki Kaisha. Photographic camera. 4,887,115, Cl. 354-289.100.
Inoue, Manabu: *See—*
Nakamura, Ikushi; Ootsuka, Hiroshi; Fukushima, Akira; Kudo, Yoshinobu; Hata, Yoshiaki; Inoue, Manabu; and Inoue, Norihiro, 4,887,107, Cl. 354-195.120.
Taniguchi, Nobuyuki; Hoda, Takeo; Hata, Yoshiaki; Inoue, Manabu; Kudo, Yoshinobu; and Ueda, Hiroshi, 4,887,108, Cl. 354-195.100.
Inoue, Masatsugu; Tokita, Kiyoshi; and Nakane, Kazunori, to Kabushiki Kaisha Toshiba. Color picture tube with shadow mask support assembly. 4,886,997, Cl. 313-406.000.
Inoue, Norihiro: *See—*
Nakamura, Ikushi; Ootsuka, Hiroshi; Fukushima, Akira; Kudo, Yoshinobu; Hata, Yoshiaki; Inoue, Manabu; and Inoue, Norihiro, 4,887,107, Cl. 354-195.120.
Inoue, Taketoshi, to NEC Corporation. Pulse counter type demodulator. 4,887,044, Cl. 329-300.000.
Inoue, Yoshihisa: *See—*
Ashimori, Atsuyuki; Ono, Taizo; Inoue, Yoshihisa; Fukaya, Chikara; and Yokoyama, Kazumasa, 4,886,819, Cl. 514-356.000.
Institut Francais du Petrole: *See—*
Cholet, Henri; and Bardin, Christian, 4,886,131, Cl. 175-340.000.
Institut Francais du Petrole, Alsthom Atlantique; Bouygues Offshore; C.F.E.M.; G.G. Doris: *See—*
Sparks, Charles, 4,886,398, Cl. 405-224.000.
Instrumentarium Corp.: *See—*
Aaltonen, Olli; Martikainen, Antti; Rantala, Borje; Ekstrom, Jan; and Toikka, Osmo, 4,886,528, Cl. 55-158.000.
Integrated Network Corporation: *See—*
Gupta, Dev V., 4,887,278, Cl. 375-7.000.
International Business Machines Corporation: *See—*
Anschel, Morris; Goodrich, Lawrence D.; and Hetrick, Barton M., 4,886,727, Cl. 430-311.000.
Belloc, Jacques; Morlec, Emile; Godard, Dominique; and Quintin, Michel, 4,887,257, Cl. 370-32.100.
Belloc, Jacques; Godard, Dominique; Morlec, Emile; and Quintin, Michel, 4,887,258, Cl. 370-32.100.
Clabes, Joachim G.; Hahn, Peter O.; Ho, Paul S.; Lefakis, Haralambos; and Rubloff, Gary W., 4,886,681, Cl. 427-38.000.
Johnson, Donavon W.; Neuman, Grover H.; Sauer, Charles H.; Shaheen-Gouda, Amal A.; and Smith, Todd A., 4,887,204, Cl. 364-200.000.
Moore, James A.; Dasheff, Andrew N.; and Kaufman, Frank B., 4,886,734, Cl. 430-270.000.
Natarajan, Bharath, 4,887,206, Cl. 364-401.000.
Natarajan, Bharath, 4,887,207, Cl. 364-401.000.
Natarajan, Bharath, 4,887,218, Cl. 364-468.000.
Zamora, Antonio; Gunther, Michael D.; and Zamora, Elena M., 4,887,212, Cl. 364-419.000.
International Flavors & Fragrances Inc.: *See—*
Boden, Richard M.; and McGhie, Joseph A., 4,886,897, Cl. 558-252.000.
Wilson, Richard A.; Butler, Jerry F.; Withycombe, Donald A.; Mookherjee, Braja D.; Katz, Ira; and Schrankel, Kenneth R., 4,886,662, Cl. 424-84.000.
International Minerals & Chemical Corp.: *See—*
Sundelin, Kurt G. R.; Salanitro, Joseph P.; and Stackhouse, Susan, 4,886,781, Cl. 514-11.000.
Inukai, Takashi: *See—*
Miyazawa, Kazutoshi; Inukai, Takashi; Inoue, Hiromichi; Saito, Shinichi; and Ohno, Kouji, 4,886,622, Cl. 252-299.610.
Inverni della Beffa S.p.A.: *See—*
Giorgi, Raffaello; Conti, Marisa; and Pifferi, Giorgio, 4,886,791, Cl. 514-100.000.
IPCO Corporation: *See—*
Weissman, Bernard, 4,885,965, Cl. 83-100.000.
Irby, George P., III; and Rosenthal, Stephen L., to Metagram Services Inc. Subscriber inventory network. 4,887,077, Cl. 340-825.470.
Ireco, Inc.: *See—*
Jensen, Finn; and Nadherny, Rudolph E., 4,886,404, Cl. 410-97.000.
Ischenko, Jury Y.: *See—*
Puzrin, Leonid G.; Atroshenko, Miron G.; Yaremenko, Vladimir L.; Ischenko, Jury Y.; Nefedov, Pavel S.; Pescherin, Ivan G.; Serebryanik, Ilya P.; and Polev, Evgeny I., 4,886,203, Cl. 228-126.000.
Isganitis, Louis V.: *See—*
Grushkin, Bernard; Hutka, David E.; Isganitis, Louis V.; and Radigan, Edward J., 4,886,729, Cl. 430-114.000.
Ishibata, Koji: *See—*
Yamane, Hisakazu; Ishida, Ritsuo; Nakanishi, Hisao; Yanai, Keiji; Toshiyasu, Masayuki; Ikegami, Kazunori; Okuda, Soichiro; Kimura, Kenji; Ishibata, Koji; and Ishii, Yoshinori, 4,886,999, Cl. 313-414.000.
Ishida, Eiichi: *See—*
Nakamura, Tadashi; Fujita, Satoshi; and Ishida, Eiichi, 4,886,135, Cl. 180-68.100.
Ishida, Ritsuo: *See—*
Yamane, Hisakazu; Ishida, Ritsuo; Nakanishi, Hisao; Yanai, Keiji; Toshiyasu, Masayuki; Ikegami, Kazunori; Okuda, Soichiro; Kimura, Kenji; Ishibata, Koji; and Ishii, Yoshinori, 4,886,999, Cl. 313-414.000.
Ishida, Yoshihiro: *See—*
Wataya, Masafumi; Sato, Yukio; Ishida, Yoshihiro; and Yamamoto, Tadashi, 4,887,095, Cl. 346-76.0PH.
Ishiguro, Kazuyoshi: *See—*
Kitazawa, Yasuho; and Ishiguro, Kazuyoshi, 4,885,825, Cl. 24-639.000.
Ishiguro, Kuniaki: *See—*
Ishikawa, Takuma; and Ishiguro, Kuniaki, 4,886,259, Cl. 270-53.000.
Ishihara, Shinichi: *See—*
Ikeda, Hayato; Kawamura, Hisato; and Ishihara, Shinichi, 4,886,424, Cl. 417-269.000.
Ishii, Yoshinori: *See—*
Yamane, Hisakazu; Ishida, Ritsuo; Nakanishi, Hisao; Yanai, Keiji; Toshiyasu, Masayuki; Ikegami, Kazunori; Okuda, Soichiro; Kimura, Kenji; Ishibata, Koji; and Ishii, Yoshinori, 4,886,999, Cl. 313-414.000.
Ishikawa, Norio; and Ishimura, Toshihiko, to Minolta Camera Kabushiki Kaisha. Data input/output device for a camera. 4,887,105, Cl. 354-21.000.
Ishikawa, Takuma; and Ishiguro, Kuniaki, to Minolta Camera Kabushiki Kaisha. Sorter-finisher system. 4,886,259, Cl. 270-53.000.
Ishimura, Toshihiko; Tsuji, Kenji; Taniguchi, Nobuyuki; and Ootsuka, Hiroshi, to Minolta Camera Kabushiki Kaisha. Photographic camera system. 4,887,119, Cl. 354-413.000.
Ishimura, Toshihiko: *See—*
Ishikawa, Norio; and Ishimura, Toshihiko, 4,887,105, Cl. 354-21.000.
Ishizu, Akira: *See—*
Niki, Kenichi; Kokogawa, Tohru; Ishizu, Akira; and Takasago, Hayato, 4,887,030, Cl. 324-158.00P.
Ishizuka, Tetuya: *See—*
Uchiyama, Kaoru; Ishizuka, Tetuya; and Sakamoto, Kiichiro, 4,887,116, Cl. 354-320.000.
Ismagilov, Foat R.: *See—*
Ismagilov, Zinfer R; Zamaraev, Kirill I.; Khairulin, Sergei R.; Alkhazov, Tofik G.; Ismagilov, Foat R.; Ivanov, Alexei A.;

Barannik, Georgy B.; Kerzhentsev, Mikhail A.; Nemkov, Valentin V.; and Parmon, Valentin N., 4,886,649, Cl. 423-230.000.

Ismagilov, Zinfer R; Zamaraev, Kirill I.; Khairulin, Sergei R.; Alkhazov, Tofik G.; Ismagilov, Foat R.; Ivanov, Alexei A.; Barannik, Georgy B.; Kerzhentsev, Mikhail A.; Nemkov, Valentin V.; and Parmon, Valentin N. Method for the purification of hydrogen sulfide-containing gases. 4,886,649, Cl. 423-230.000.

Isoda, Takeshi: *See—*
Arai, Mikiro; Funayama, Osamu; Tashiro, Yuuji; and Isoda, Takeshi, 4,886,860, Cl. 525-474.000.

Isozumi, Shuzoo: *See—*
Tanaka, Toshinori; Isozumi, Shuzoo; and Konishi, Keiichi, 4,886,306, Cl. 290-48.000.

Isuzu Motors Limited: *See—*
Kawamura, Hideo, 4,886,978, Cl. 290-52.000.

Itahana, Tsutomu; Ono, Tetsuo; and Sugimoto, Tamio, to Mitsubishi Jukogyo Kabushiki Kaisha. Capacity control device of scroll-type fluid compressor. 4,886,425, Cl. 417-309.000.

Itakura Soki: *See—*
Itakura, Tsuyoshi; and Willinger, Allan H., 4,886,093, Cl. 137-855.000.

Itakura, Toru, to Fuji Photo Film Co., Ltd. Light beam scanning apparatus. 4,886,967, Cl. 250-327.200.

Itakura, Tsuyoshi; and Willinger, Allan H., to Itakura Soki; and Willinger, Brothers, Inc. Vent valve of an air pump. 4,886,093, Cl. 137-855.000.

Italtel Societa Italiana: *See—*
Lentini, Salvatore; and Patti, Giuseppe, 4,886,981, Cl. 307-87.000.

Itani, Akira: *See—*
Ohga, Akihito; and Itani, Akira, 4,886,654, Cl. 423-598.000.

Ito, Sadao, to Aisin Seiki Kabushiki Kaisha. Seat angle regulating apparatus. 4,887,017, Cl. 318-626.000.

Itoh & Co., Ltd.: *See—*
Coe, Thomas U., 4,887,179, Cl. 360-135.000.

IVAC Corporation: *See—*
Maget, Henri J. R., 4,886,514, Cl. 604-891.100.

Ivanov, Alexei A.: *See—*
Ismagilov, Zinfer R; Zamaraev, Kirill I.; Khairulin, Sergei R.; Alkhazov, Tofik G.; Ismagilov, Foat R.; Ivanov, Alexei A.; Barannik, Georgy B.; Kerzhentsev, Mikhail A.; Nemkov, Valentin V.; and Parmon, Valentin N., 4,886,649, Cl. 423-230.000.

Iwahashi, Kunimitsu, to Sugiyasu Industries Co., Ltd. Underground vehicle lift. 4,886,145, Cl. 187-8.710.

Iwai, Tohru: *See—*
Shibano, Yoshizo; Suzuki, Haruo; and Iwai, Tohru, 4,887,090, Cl. 343-711.000.

Iwai, Yuzuru: *See—*
Omura, Satoshi; Nakagawa, Akira; and Iwai, Yuzuru, 4,886,884, Cl. 546-36.000.

Iwakabe, Yasushi: *See—*
Hayashida, Shigeru; Tai, Seiji; Hayashi, Nobuyuki; Iwakabe, Yasushi; Kinjo, Noriyuki; and Numata, Shunichi, 4,886,721, Cl. 430-59.000.

Iwamoto, Shigeki: *See—*
Haranoya, Tomoji; and Iwamoto, Shigeki, 4,886,693, Cl. 428-90.000.

Iwamura, Takuro; and Kobayashi, Masao, to Mitsubishi Kinzoku Kabushiki Kaisha. Electrical contact spring material made of copper base alloy of high strength and toughness with reduced anisotropy in characteristics. 4,886,641, Cl. 420-470.000.

Iwanami, Shigeki; Inagaki, Mitsuo; Sasaya, Hideaki; Tanaka, Taro; and Kojima, Akikazu, to Nippon Soken, Inc. Variable displacement swash-plate type compressor. 4,886,423, Cl. 417-222.000.

Iwatsu Electric Co., Ltd.: *See—*
Oto, Ikuo; Hyakutake, Hayato; and Kobirumaki, Ryo, 4,886,730, Cl. 430-137.000.

Iwatsuka, Takeshi; and Kasai, Toshio, to Japan Organo Co., Ltd. Column filter using bundles of long fibers. 4,886,601, Cl. 210-321.790.

Izumi, Masaki; and Miura, Tsutomu, to Eastman Kodak Company. Thermal recording apparatus. 4,887,094, Cl. 346-76.0PH.

J. Gibson McIlvain Company: *See—*
Bell, David C.; and Smith, Joe, 4,885,967, Cl. 83-520.000.

J. M. Huber Corporation: *See—*
Carson, Forrest L.; and Johnson, Kenneth M., 4,886,303, Cl. 285-99.000.
Dallavia, Anthony J., Jr.; Vande Ven, Susan; and Smith, Bobby E., 4,886,839, Cl. 521-124.000.

Jackson, Kevin B: *See—*
Boland, Bernard W.; Gandy, William E., Jr.; and Jackson, Kevin B, 4,886,762, Cl. 437-15.000.

Jackson, Richard S.: *See—*
Sunnen, Robert M.; Vanderwal, Frank E.; and Jackson, Richard S., 4,886,157, Cl. 198-839.000.

Jackson, Ronald E., to Valera Electronics Inc. HVAC zone control system. 4,886,110, Cl. 165-22.000.

Jacobs, Martin J., to Pitman-Moore, Inc. Housefly chemosterilants. 4,886,899, Cl. 560-064.000.

Jacobs, Philip J.: *See—*
Gondar, Robert K.; and Jacobs, Philip J., 4,886,009, Cl. 116-208.000.

Jacobsen, Stephen C.; Petelenz, Tomasz J.; and Stephen, Robert L. Flow-through methods and apparatus for iontophoresis application of medicaments at a controlled pH. 4,886,489, Cl. 604-20.000.

Jahn-Held, Wilhelm; Lindoerfer, Walter; and Wartenpfuhl, Friedel, to Wintershall Aktiengesellschaft. Pretreatment of solid wastes, and wastes to be compacted, for introduction into underground salt cavities of salt caverns via a downpipe under the force of gravity. 4,886,393, Cl. 405-128.000.

Jakobsson, Leif. Heat accumulator. 4,885,915, Cl. 62-238.600.

Jamali, Jamal; and Roztocil, Tomas, to Eastman Kodak Company. Method and apparatus for reproducing documents with variable information. 4,887,128, Cl. 355-202.000.

James Hardie Irrigation, Inc.: *See—*
Dawn, Alan W., 4,886,209, Cl. 239-116.000.

James Mackie & Sons Limited: *See—*
Hunt, Robert J.; and Crockard, Kenneth F., 4,885,904, Cl. 57-67.000.

James River Norwalk, Inc.: *See—*
Brown, Richard K.; and Seiferth, Oscar E., 4,886,950, Cl. 219-10.55E.

Jandeska, William F., Jr.; Rezhets, Vadim; and Ligotti, Carlo, to General Motors Corporation. Presinter treatment for iron powder article formed with boride additive. 4,886,637, Cl. 419-12.000.

Janome Sewing Machine Co., Ltd.: *See—*
Orii, Akira; and Nakamura, Takashi, 4,887,307, Cl. 388-810.000.

Janowicz, Andrew H., to Du Pont de Nemours, E. I., and Company. Molecular weight control in free radical polymerizations. 4,886,861, Cl. 526-145.000.

Janulis, Eugene P., to Minnesota Mining and Manufacturing Company. Fluorine-containing chiral smectic liquid crystals. 4,886,619, Cl. 252-299.100.

Japan Air Lines Co., Ltd.: *See—*
Hashimoto, Masayuki; Sakamoto, Manabu; Tsutsui, Taizo; Satoh, Satoshi; Kouza, Yukihiko; Murakami, Keikichi; Soga, Tonokatsu; Takeishi, Akira; Takusagawa, Teruhiko; and Hayashi, Misao, 4,885,816, Cl. 15-53.00A.

Japan Organo Co., Ltd.: *See—*
Iwatsuka, Takeshi; and Kasai, Toshio, 4,886,601, Cl. 210-321.790.

Japan Synthetic Rubber Co., Ltd.: *See—*
Koshiba, Mitsunobu; Yamada, Keiichi; Harita, Yoshiyuki; Kawamura, Shin'ichi; and Furuto, Yuuji, 4,886,565, Cl. 156-345.000.

Japuntich, Daniel A.: *See—*
Brostrom, Gerald M.; Japuntich, Daniel A.; and Yard, Sabrina M., 4,886,058, Cl. 128-206.120.

Jaworowski, Mark R.; and Gruver, Gary A., to United Technologies Corporation. Method for monitoring the removal of a metallic contaminant from the surface of a metallic article. 4,886,552, Cl. 134-27.000.

Jelich, Klaus: *See—*
Gayer, Herbert; Jelich, Klaus; Lunkenheimer, Winfried; Brandes, Wilhelm; and Hanssler, Gerd, 4,886,833, Cl. 514-521.000.

Jelinek, Vaclav, to SSMC Inc. Fabric easing drum. 4,886,006, Cl. 112-313.000.

Jenkins, James O. M., to Siliconix Limited. Telephone instrument. 4,887,295, Cl. 379-362.000.

Jennings, Stephen R.: *See—*
Ojha, Sureshchandra M.; Jennings, Stephen R.; and Johnston, Anthony D., 4,886,569, Cl. 156-643.000.

Jensen Corporation: *See—*
McCabe, Stanley G., 4,885,853, Cl. 38-143.000.

Jensen, Finn; and Nadherny, Rudolph E., to Ireco, Inc. Support assembly with retainer. 4,886,404, Cl. 410-97.000.

Jensen, Jens S.: *See—*
Marcker, Kjeld A.; and Jensen, Jens S., 4,886,753, Cl. 435-172.300.

Jeschke, Willi, to Heidelberger Druckmaschinen AG. Sheet feeder for a printing machine. 4,886,261, Cl. 271-11.000.

Jidosha Kiki Co., Ltd.: *See—*
Shimamura, Morihiko, 4,885,982, Cl. 60-547.100.

Jinno, Masafumi; Kake, Ichiro; Nishina, Yuichiro; and Masumoto, Tsuyoshi. Photochromic material, photochromic device and method for recording and erasing information. 4,886,717, Cl. 430-19.000.

Joannou, Costantinos J. Electronic air filtration system. 4,886,526, Cl. 55-131.000.

Joder, Andy: *See—*
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Keane, Thomas J. Combined gloss and color measuring instrument. 4,886,355, Cl. 356-73.000.

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Kent, Allan R.; Read, Harold A.; Henry, Barry A.; Kaczor, Charles E.; Mills, Milton V.; Carn, Ronald C.; Metz, Donald R.; Zagame, Steven P.; and Kirk, Robert C., to Digital Equipment Corporation. Computer interconnect coupler for clusters of data processing devices. 4,887,076, Cl. 340-825.160.

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Khan, M. Rashid, to United States of America, Energy. Decaking of coal or oil shale during pyrolysis in the presence of iron oxides. 4,886,521, Cl. 44-607.000.

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Tan, Hiroaki; Yokoyama, Keiichi; and Kihara, Noriaki, 4,886,912, Cl. 564-240.000.
Kikuchi, Kenichi: *See—*
Matsuzaki, Atsushi; Kobayashi, Hiroyuki; Tomita, Hideo; Kikuchi, Kenichi; Inoue, Kenji; Kondo, Yoshiyuki; Hirayasu, Masatoshi; and Ichise, Atsushi, 4,887,152, Cl. 358-86.000.
Killian, Edmund F.; and Berliner, Wallace H., to Waldes Truarc, Inc. Bowed external spring retaining ring of the E-shaped type. 4,886,408, Cl. 411-519.000.
Kim, Byoung-Chul: *See—*
Kim, Kwang-Ung; Kim, Byoung-Chul; and Hong, Soon-Man, 4,886,837, Cl. 521-85.000.
Kim, Kwang-Ung; Kim, Byoung-Chul; and Hong, Soon-Man, to Korea Advanced Institute of Science & Technology. Process for preparing rigid polyvinyl chloride structured foams having superior surface characteristics. 4,886,837, Cl. 521-85.000.
Kim, Young J.: *See—*
Lee, Chang H.; and Kim, Young J., 4,886,207, Cl. 236-12.120.
Kim, Young K. Automatic water-supplying flowerpot utilizing the capillary action and its water-supplying control method. 4,885,869, Cl. 47-66.000.
Kimberlin, Denver K., to Engineering Enterprises, Inc. Bladder pump assembly. 4,886,432, Cl. 417-478.000.
Kimberly-Clark Corporation: *See—*
Damico, Joyce A.; and Weber, Rebecca J., 4,886,512, Cl. 609-385.200.
Mason, Stanley L, Jr.; and Handler, Michael D., 4,886,513, Cl. 604-385.100.
Van Iten, Thomas P.; Whitehead, Howard A.; and Schindel, Julie A., 4,886,632, Cl. 264-156.000.
Kimura, Etsuji; Hasegawa, Nozomu; and Nishiyama, Yutaka, to Mitsubishi Kinzoku Kabushiki Kaisha. Process for preparing compound metal oxides. 4,886,777, Cl. 505-1.000.
Kimura, Kenji: *See—*
Yamane, Hisakazu; Ishida, Ritsuo; Nakanishi, Hisao; Yanai, Keiji; Toshiyasu, Masayuki; Ikegami, Kazunori; Okuda, Soichiro; Kimura, Kenji; Ishibata, Koji; and Ishii, Yoshinori, 4,886,999, Cl. 313-414.000.
Kimura, Masatoshi: *See—*
Mukai, Seiichi; Kimura, Masatoshi; and Morita, Shohachi, 4,886,873, Cl. 528-353.000.
Kimura, Mitsutoshi; and Baba, Masaharu, to Kabushiki Kaisha Toshiba. Light detector having light sensor and light indicator, and control circuit thereof. 4,886,961, Cl. 250-205.000.
Kimura, Okitoshi; Kabata, Toshiyuki; and Ohsawa, Toshiyuki, to Ricoh Company, Ltd. Composite electrode comprising a bonded body of aluminum and electroconductive polymer and electric cell using such a composite electrode. 4,886,572, Cl. 156-633.000.
Kimura, Shinichi, to Sharp Kabushiki Kaisha. Heating apparatus for maintaining a solution at a predetermined temperature. 4,886,955, Cl. 219-494.000.
Kimura, Tetsuo; and Kobayashi, Akihiro, to Nittan Company, Limited. Alarm apparatus. 4,887,072, Cl. 340-691.000.
Kimura, Yutaka: *See—*
Kumagai, Chiaki; Juman, Shinji; Kimura, Yutaka; and Mitomo, Haruhito, 4,887,215, Cl. 364-431.040.
Kincaid, Larry: *See—*
Aidlin, Samuel S.; Aidlin, Stephen H.; and Kincaid, Larry, 4,886,567, Cl. 156-423.000.
King, Francis D., to Beecham Group p.l.c. Indazolyl carboxylic acid amides useful for treating migraine clusters headache, trigeminal neuralgia or emesis. 4,886,808, Cl. 514-299.000.
King, L. Tony, to Komax Systems, Inc. Rotary mixer. 4,886,368, Cl. 366-150.000.
Kinjo, Noriyuki: *See—*
Hayashida, Shigeru; Tai, Seiji; Hayashi, Nobuyuki; Iwakabe, Yasushi; Kinjo, Noriyuki; and Numata, Shunichi, 4,886,721, Cl. 430-59.000.
Kinnan, Frank R., to Conductron Corporation. Cable sealing device and method. 4,886,939, Cl. 174-77.00R.
Kinnebrew, Earl, II; and Palmer, Paul D., Sr., to Rhema Enterprises, Inc. Thread dyeing apparatus and method. 4,886,515, Cl. 8-149.000.
Kinney, William A.; Failli, Amadeo A.; and Mir, Ghulam N., to American Home Products Corporation. 2-pyridinecarbothioamides and pharmaceutical compositions comprising the same useful as anti ulcer agents. 4,886,821, Cl. 514-357.000.
Kinnick, John F.; and Kozlowski, Chester P., to Dominion Tool & Die Company, Inc. Wheel/tire load simulating apparatus. 4,886,101, Cl. 157-1.220.
Kinoshita, Masahide; Tajima, Hatsuo; Hoshika, Norihisa; Tajika, Hiroshi; and Hosoi, Atsushi, to Canon Kabushiki Kaisha. Developing apparatus using magnetic particles and toner particles. 4,887,131, Cl. 355-253.000.
Kinoshita, Takao; and Tojo, Akihiko, to Canon Kabushiki Kaisha. Image-pickup device and system capable of outputting either combined (high band) or separate (low band) signals. 4,887,160, Cl. 358-213.260.
Kirchgessner, Hilmar: *See—*
Engelberger, Raimund; Harmsen, Siegfried; Kirchgessner, Hilmar; and Schneider, Josef, 4,886,415, Cl. 415-119.000.
Kirchhoff, Hartmut: *See—*
Pekruhn, Wolfgang; Kaiser, Ralf; and Kirchhoff, Hartmut, 4,887,092, Cl. 346-1.100.
Kirk, Robert C.: *See—*
Kent, Allan R.; Read, Harold A.; Henry, Barry A.; Kaczor, Charles E.; Mills, Milton V.; Carn, Ronald C.; Metz, Donald R.; Zagame, Steven P.; and Kirk, Robert C., 4,887,076, Cl. 340-825.160.
Kirsch, Howard C.: *See—*
Cheney, Glen T.; Kirsch, Howard C.; Nelson, James T.; and Stefany, James H., 4,887,135, Cl. 357-23.600.
Kirschner, Jonathan; Smazik, Kenneth G.; and Paisley, Gary V., to Coca-Cola Company, The. Postmix juice dispensing system. 4,886,190, Cl. 222-57.000.
Kirson, Yoram; and Marom, Itsak, to State of Israel-Ministry of Defence Armament Development Authority. Stabilized line-of-sight aiming system for use with fire control systems. 4,885,977, Cl. 89-41.050.
Kishimoto, Mitsuharu: *See—*
Maeda, Takuya; Murakami, Keikichi; Yamada, Tsutomu; Kishimoto, Mitsuharu; Yajima, Kenichi; and Takemura, Yoshihiko, 4,886,246, Cl. 266-157.000.
Kita, Keiko: *See—*
Kawamura, Masahide; Sakakibara, Masaki; Watanabe, Teruo; Obauashi, Akira; Hiraoka, Nobutsugu; and Kita, Keiko, 4,886,756, Cl. 435-199.000.
Kitabatake, Senji: *See—*
Dombou, Munehiko; Tomioka, Isao; Kitabatake, Senji; and Nakejima, Hiroshi, 4,886,749, Cl. 435-89.000.
Kitagaki, Kanshiro; Ebihara, Keiko; Morioka, Shigeo; Nakamura, Takao; and Okada, Taizo, to Sato Pharmaceutical Co., Ltd. External preparation composition. 4,886,667, Cl. 424-195.100.
Kitagishi, Kozomu: *See—*
Hoshi, Hiroaki; and Kitagishi, Kozomu, 4,886,959, Cl. 250-201.000.
Kitamura, Norihiko; and Ohnishi, Akimoto, to Nippon Zoki Pharmaceutical Co., Ltd. Novel pyrimidopyrimidine derivative, process for producing it and pharmaceutical composition. 4,886,807, Cl. 514-258.000.
Kitano, Hirohisa; Saito, Itaru; Shingaki, Kouichi; Matsubara, Ken; and Masuda, Tomohiko, to Minolta Camera Kabushiki Kaisha. Electro-optical light shutter device and printer apparatus using same. 4,887,104, Cl. 350-355.000.
Kitazato Institute, The: *See—*
Omura, Satoshi; Nakagawa, Akira; and Iwai, Yuzuru, 4,886,884, Cl. 546-36.000.
Kitazawa, Yasuho; and Ishiguro, Kazuyoshi, to Kabushiki Kaisha Tikai-Rika-Denki-Seisakusho. Buckle apparatus. 4,885,825, Cl. 24-639.000.
Kitchen, Garret. Fuel spill prevention valve. 4,886,087, Cl. 137-68.100.
Kitney, Howard R.: *See—*
Leggett, Henry H.; and Kitney, Howard R., 4,886,115, Cl. 166-77.000.
Kitzing, Walter: *See—*
Horn, Jurgen; and Kitzing, Walter, 4,886,133, Cl. 177-211.000.
Kiya, Nobuyuki; and Sakamoto, Keiji, to Fanuc Ltd. Injection control apparatus for injection molding machine. 4,887,012, Cl. 318-434.000.
Kiya, Nobuyuki; Toriyama, Shuji; and Saiki, Yoshiharu, to Fanuc Ltd. Parameter initializing method for a programmable machine controller. 4,887,220, Cl. 364-474.110.
Kizawa, Takashi: *See—*
Adachi, Minoru; and Kizawa, Takashi, 4,886,377, Cl. 384-49.000.
Klaes, Gerald F.: *See—*
Davis, Edward H.; Klaes, Gerald F.; Harris, Jack L.; and Douglass, Paul L., 4,885,928, Cl. 72-410.000.
Klein, Willem: *See—*
Rook, Cornelis; and Klein, Willem, 4,886,633, Cl. 264-219.000.
Kleiner, Hans-Jerg, to Hoechst Aktiengesellschaft. Process for the preparation of aminocarbonylmethanoic acids of phosphorus. 4,886,628, Cl. 56-15.000.
Kleinhuizen, David W. Soil grading apparatus with sifting and transporting capability. 4,886,124, Cl. 172-32.000.
Kleinschmit, Einhard: *See—*
Gutfleisch, Siegfried; Hopsch, Gerhard; and Kleinschmit, Einhard, 4,886,481, Cl. 464-162.000.
Kleschick, William A.; Ehr, Robert J.; Costales, Mark J.; Gerwick, Ben C., III; Meikle, Richard W., deceased (by Meikle, Diane, heir); Monte, William T.; and Pearson, Norman R., to Dow Chemical Company, The. Substituted 1,2,4-triazolo[1,5-a]pyrimidine-2-sulfonyl chlorides. 4,886,883, Cl. 544-263.000.
Kligerman, Alan E. Carton for containing a plurality of items for transport, storage and display. 4,886,160, Cl. 206-44.00R.
Klinedinst, Paul W.; and Smeltzer, Thomas, to Graham Engineering Corporation. Blow molded bottle extraction, trimming and discharge apparatus. 4,886,443, Cl. 425-537.000.
Klingert, Bernd: *See—*
Lang, Robert W.; and Klingert, Bernd, 4,886,879, Cl. 540-486.000.
Klink, Josef: *See—*
Konzmann, Rainer; Ohlhausen, Otto; Schmitt, Joachim; Koucky, Antonin; and Klink, Josef, 4,886,317, Cl. 297-417.000.
Klipa, Dennis K.; and Dewald, James R., to Dow Chemical Company, The. Catalyst for dehydrohalogenation. 4,886,922, Cl. 570-193.000.

Kloeckner-Humboldt-Deutz AG: *See*—
Lichtblau, Leo, 4,886,418, Cl. 415-912.000.
Kluth, Hermann: *See*—
Meffert, Alfred; and Kluth, Hermann, 4,886,893, Cl. 549-562.000.
Knauer, Wolfgang, to Hughes Aircraft Company. Cluster beam apparatus utilizing cold cathode cluster ionizer. 4,886,969, Cl. 250-427.000.
Knight, Thomas F.: *See*—
Holloway, John T.; Moon, David A.; Cannon, Howard I.; Knight, Thomas F.; Edwards, Bruce E.; and Weinreb, Daniel L., 4,887,235, Cl. 364-900.000.
Knopf, Robert J.; and Theiling, Louis F., Jr., to Union Carbide Chemicals and Plastics Company Inc. Alkoxylation using calcium catalysts and products therefrom. 4,886,917, Cl. 568-623.000.
Kobayashi, Akihiro: *See*—
Kimura, Tetsuo; and Kobayashi, Akihiro, 4,887,072, Cl. 340-691.000.
Kobayashi, Hiroyasu: *See*—
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Kobayashi, Hiroyuki: *See*—
Matsuzaki, Atsushi; Kobayashi, Hiroyuki; Tomita, Hideo; Kikuchi, Kenichi; Inoue, Kenji; Kondo, Yoshiyuki; Hirayasu, Masatoshi; and Ichise, Atsushi, 4,887,152, Cl. 358-86.000.
Kobayashi, Katsuyuki: *See*—
Mori, Shigeki; Kobayashi, Katsuyuki; Taniishi, Shinnosuke; and Yamamoto, Kousuke, 4,887,245, Cl. 367-129.000.
Suzuki, Noriyuki; Tanaka, Atsushi; Kaneko, Kiyoshi; Yoshimura, Yuichiro; Taniishi, Shinnosuke; Kobayashi, Katsuyuki; and Mori, Shigeki, 4,886,943, Cl. 178-18.000.
Kobayashi, Masao: *See*—
Iwamura, Takuro; and Kobayashi, Masao, 4,886,641, Cl. 420-470.000.
Kobayashi, Mikio; and Ueno, Akira, to Ricoh Company, Ltd. Electronic flash photographing system. 4,887,120, Cl. 354-416.000.
Kobayashi, Ryuichi, to Canon Kabushiki Kaisha. Camera having autofocus device. 4,887,117, Cl. 354-400.000.
Kobayashi, Tatuya: *See*—
Yoshikawa, Masao; and Kobayashi, Tatuya, 4,887,102, Cl. 346-157.000.
Kobayashi, Yutaka: *See*—
Satake, Yoshikatsu; Kaneko, Takashi; Kobayashi, Yutaka; Iizuka, Yo; Katto, Takayuki; and Shiiki, Zenya, 4,886,871, Cl. 528-226.000.
Kobinger, Walter: *See*—
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Kobirumaki, Ryo: *See*—
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Kobrehel, Gabrijela: *See*—
Djokic, Slobodan; Lopotar, Nevenka; Kobrehel, Gabrijela; Krnjevic, Hrvoje; and Carevic, Olga, 4,886,792, Cl. 514-183.000.
Koci, Zdenek, to Ciga-Geigy Corporation. Vat dye and sulfur dye compositions. 4,886,549, Cl. 106-19.000.
Kodama, Yutaka: *See*—
Ikeda, Kunihiko; Suzuki, Shigeru; Yokota, Takashi; Shimura, Akira; Kodama, Yutaka; Yamazaki, Shigeru; Niro, Masaichi; and Tomita, Satoru, 4,887,133, Cl. 355-321.000.
Koger, Hein S.: *See*—
Bertola, Mauro A.; Marx, Arthur F.; Koger, Hein S.; Quax, Wilhelmus J.; Van der Laken, Cornelis J.; Phillips, Gareth T.; Robertson, Brian W.; and Watts, Peter D., 4,886,750, Cl. 435-136.000.
Koguchi, Kiichiro: *See*—
Tsuchida, Masami; Suzuki, Shiro; Koguchi, Kiichiro; Takahashi, Tokihiro; and Sato, Takayuki, 4,887,170, Cl. 360-15.000.
Kogure, Yasuo, to Hoya Corporation. Reference corrected color sensor. 4,886,366, Cl. 356-406.000.
Kohge, Shinichi: *See*—
Kozuka, Hajime; Saito, Naoki; Morishita, Mitsuharu; and Kohge, Shinichi, 4,886,136, Cl. 180-79.100.
Kohjin Co., Ltd.: *See*—
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Kohler Co.: *See*—
Gaffney, Thomas E.; and Wahlen, Patrick S., 4,886,210, Cl. 239-193.000.
Kohno, Michio: *See*—
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Kohno, Yoshio: *See*—
Yoneda, Masahiro; Hatanaka, Masahiro; Kohno, Yoshio; Satoh, Shinichi; Oda, Hidekazu; and Moriizumi, Koichi, 4,887,137, Cl. 357-23.600.
Koike, Masaaki: *See*—
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Koizumi, Masaaki: *See*—
Shindo, Takuji; Naito, Hiromitsu; Kondo, Masayoshi; Fukuyama, Takashi; Koizumi, Masaaki; and Fukada, Nobuo, 4,886,559, Cl. 148-421.000.
Koizumi, Sachio: *See*—
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Kojima, Akikazu: *See*—
Iwanami, Shigeki; Inagaki, Mitsuo; Sasaya, Hideaki; Tanaka, Taro; and Kojima, Akikazu, 4,886,423, Cl. 417-222.000.
Kokayeff, Peter; and Abdo, Suheil F., to Union Oil Company of California. Ni/Cu absorbent/catalyst for desulfurization and isomerization of n-paraffins. 4,886,935, Cl. 585-737.000.
Kokogawa, Tohru: *See*—
Niki, Kenichi; Kokogawa, Tohru; Ishizu, Akira; and Takasago, Hayato, 4,887,030, Cl. 324-158.00P.
Kolcraft Products, Inc.: *See*—
Johnson, Edward M., 4,886,315, Cl. 297-250.000.
Komatsu, Kenichi, to Kabushiki Kaisha Toshiba. Linear photo sensing device. 4,887,139, Cl. 357-30.000.
Komatsu, Yasuji: *See*—
Yoshimura, Narihiko; Komatsu, Yasuji; and Tomizawa, Hirotaka, 4,886,613, Cl. 252-79.000.
Yoshimura, Narihiko; Tomizawa, Hirotaka; and Komatsu, Yasuji, 4,886,614, Cl. 252-79.000.
Komatsubara, Kiichi; Tanuma, Seiichi; Okabe, Katsuya; and Katsuyama, Toshio, to Hitachi, Ltd. Intercalation compound and generator of coherent radiation using the same. 4,887,273, Cl. 372-41.000.
Komatsuzaki, Hiroshi: *See*—
Fujita, Yoshihiro; Komatsuzaki, Hiroshi; Shoji, Masao; Noguchi, Yukio; Hirai, Masayoshi; and Ohno, Kazunori, 4,887,109, Cl. 354-222.000.
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Komoda, Hideaki: *See*—
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Kondo, Eiji: *See*—
Asaka, Junichiro; Fujiwara, Tamio; Fujiwara, Takashi; Kuwajima, Goro; Kondo, Eiji; and Shin, Masaru, 4,886,748, Cl. 435-69.700.
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Kondo, Masayoshi: *See*—
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Kondo, Yoshiyuki: *See*—
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Kondou, Tsutomu, to Mitsubishi Kasei Corporation; and Nikkon Chemicals Company, Limited. Surface-modified meso-erythritol composition. 4,886,677, Cl. 426-548.000.
Konishi, Keiichi: *See*—
Tanaka, Toshinori; Isozumi, Shuzoo; and Konishi, Keiichi, 4,886,306, Cl. 290-48.000.
Konrad, Eugen; and Clausen, Thomas, to Wella Aktiengesellschaft. Diaminotetrafluoroethoxybenzenes, process for producing same and hair coloring agents containing same. 4,886,516, Cl. 8-408.000.
Konzmann, Rainer; Ohlhausen, Otto; Schmitt, Joachim; Koucky, Antonin; and Klink, Josef, to Daimler-Benz Aktiengesellschaft. Motor vehicle seat arm rest control. 4,886,317, Cl. 297-417.000.
Korber AG: *See*—
Hinzmann, Alfred; Preisner, Peter M.; and Shu, Timour T., 4,886,077, Cl. 131-282.000.
Korber, Jurgen: *See*—
Trube, Hans; Korber, Jurgen; and Duenas, Santiago, 4,886,311, Cl. 296-37.120.
Korea Advanced Institute of Science & Technology: *See*—
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Korenstein, Ralph: *See*—
Hoke, William E.; Specht, Lindley T.; and Korenstein, Ralph, 4,886,683, Cl. 427-252.000.
Korfanta, Craig M. Golf club measuring and fitting apparatus. 4,885,847, Cl. 33-508.000.
Korpan, Brian A. Cooking grid system. 4,885,989, Cl. 99-450.000.
Korpman, Ralf, to Personal Products Company. Corrugated disposable diaper. 4,886,511, Cl. 604-365.000.
Kortright, Kenneth H.; Hofheinz, David E.; Forman, Meryl A.; Lee, Song Y.; Smariga, Paulette E.; and Stoner, Candie S., to Coulter Corporation. Enzyme immunoassay for detecting HIV antigens in human sera. 4,886,742, Cl. 435-5.000.
Kosaka, Takayuki: *See*—
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Kosanetzky, Josef-Maria: *See*—
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Dussinger, Thomas E.; Riley, John M.; and Kosarko, Gerald J., 4,887,176, Cl. 360-105.000.
Koschmieder, Hartmut; and Petri, Werner, to INA Walzlager Schaeffler KG. Novel tensioning device. 4,886,482, Cl. 474-133.000.

Kosha, Hideaki: *See*—
Hazumi, Kazuo; Watanabe, Hideomi; Okita, Tsutomu; Ryoke, Katsumi; and Kosha, Hideaki, 4,886,703, Cl. 428-323.000.
Koshiba, Mitsunobu; Yamada, Keiichi; Harita, Yoshiyuki; Kawamura, Shin'ichi; and Furuto, Yuuji, to Japan Synthetic Rubber Co., Ltd. Reactive ion etching apparatus. 4,886,565, Cl. 156-345.000.
Koshihara, Toshio; Misawa, Rokurou; Sagawa, Yuzo; and Takehara, Kimio, to NKK Corporation. Method for detecting a state of substance existing in pipe. 4,886,370, Cl. 374-5.000.
Kosugi, Toru; Furukawa, Takahiro; and Miyaou, Hirohisa, to Fujitsu Limited. Bipolar with eight-zeros substitution and bipolar with six-zeros substitution coding circuit. 4,887,083, Cl. 341-56.000.
Kotliar, Abraham M.; Sacks, William; Sibilia, John P.; and Kumar, Rakesh, to Ausimont, U.S.A., Inc. Matrix-matrix polyblend adhesives and method of bonding incompatible polymers. 4,886,689, Cl. 428-35.700.
Koucky, Antonin: *See*—
Konzmann, Rainer; Ohlhausen, Otto; Schmitt, Joachim; Koucky, Antonin; and Klink, Josef, 4,886,317, Cl. 297-417.000.
Kouno, Masaaki: *See*—
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Kourtides, Demetrius A.: *See*—
Mikroyannidis, John A.; and Kourtides, Demetrius A., 4,886,896, Cl. 558-193.000.
Kouza, Yukihiko: *See*—
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Kovacs, Joseph, to Arcopharma Ltd. Compositions of oats and nettle extracts to be used as a food additive or pharmaceutical preparation in human health care. 4,886,665, Cl. 424-195.100.
Kowa Company, Ltd.: *See*—
Shibuya, Kimiyuki; Takahashi, Yoshio; Sato, Seiichi; Shigyo, Hiromichi; Ohta, Tomio; and Uchida, Yasumi, 4,886,822, Cl. 514-357.000.
Kozlowski, Chester P.: *See*—
Kinnick, John F.; and Kozlowski, Chester P., 4,886,101, Cl. 157-1.220.
Kozlowski, Eric F., to Lear Siegler Seating Corp. Method and apparatus for positioning fabric covers on a foam cushion. 4,885,828, Cl. 29-91.500.
Kozuka, Hajime; Saito, Naoki; Morishita, Mitsuharu; and Kohge, Shinichi, to Mitsubishi Denki Kabushiki Kaisha; and Nippon Seiko Kabushiki Kaisha. Motor-driven type power assisted steering control apparatus. 4,886,136, Cl. 180-79.100.
Kraaij, Wouter; and Visser, Meindert, to Fano International Limited. Emergency lighting system. 4,887,004, Cl. 315-86.000.
Kraftwerk Union Aktiengesellschaft: *See*—
Cirkel, Hans-Jurgen; Bette, Willi; and Muller, Reinhard, 4,887,275, Cl. 372-83.000.
Kranzeder, Josef: *See*—
Andrees, Gerhard; Kranzeder, Josef; and Vogel, Wilhelm, 4,886,639, Cl. 419-28.000.
Kraus, Charles E., to Excelermatic Inc. Multimode infinitely variable transmission. 4,885,955, Cl. 74-691.000.
Krause, Alan E., II; and Willett, Russell G., to Cherubini, Jack. Row bar-actuated land vehicle. 4,886,287, Cl. 280-246.000.
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Hopf, Reinhard; Scheuble, Bernhard; Wachtler, Andreas; Hittich, Reinhard; Eidenschink, Rudolf; Geelhaar, Thomas; Krause, Joachim; and Reiffenrath, Volker, 4,886,620, Cl. 252-299.610.
Krbechek, LeRoy: *See*—
Mattison, Phillip L.; Wirth, Ronald P.; Virnig, Michael J.; and Krbechek, LeRoy, 4,886,889, Cl. 548-497.000.
Krenik, William R.; Hsu, Wei-chan; and Nail, Richard, to Texas Instruments Incorporated. Differential amplifier having extended common mode input voltage range. 4,887,048, Cl. 330-258.000.
Kress Corporation: *See*—
Kress, Edward S.; and Carpenter, Gene, 4,886,580, Cl. 202-228.000.
Kress, Edward S.; and Carpenter, Gene, to Kress Corporation. Dry quenching coke box. 4,886,580, Cl. 202-228.000.
Krishnan, Gopala; Gusman, Michael; Johnson, Sylvia M.; Rowcliffe, David J.; and Nakano, Hajime, to Osaka Gas Co., Ltd. Production of metal carbides. 4,886,652, Cl. 423-439.000.
Kristensen, Olav A., to K.E.W. Industri A/S. Ejection nozzle for high-pressure cleaning units. 4,886,213, Cl. 239-458.000.
Krnjevic, Hrvoje: *See*—
Djokic, Slobodan; Lopotar, Nevenka; Kobrehel, Gabrijela; Krnjevic, Hrvoje; and Carevic, Olga, 4,886,792, Cl. 514-183.000.
Krone AG: *See*—
Biederstedt, Lutz; and Muller, Manfred, 4,887,183, Cl. 361-124.000.
Kroniger, Wilhelm; Martin, Roland; and Aydt, Guenter, to Dr. Ing. H.c.F. Porsche AG. Brake arrangement. 4,886,147, Cl. 188-73.370.
Krowne, Clifford M., to United States of America, Navy. Solid state space harmonic amplifier. 4,887,049, Cl. 330-286.000.
Krug, Rainer: *See*—
Bernhardt, Bruno; Hessner, Anton; and Krug, Rainer, 4,886,119, Cl. 166-267.000.
Krzelowski, Zygmunt P.: *See*—
Gagnon, Claude; Gelineau, Claude; Raymond, Pierre; Krzelowski, Zygmunt P.; and Galletly, George, 4,886,940, Cl. 174-88.00B.
Kubodera, Seiiti; and Minagawa, Nobuhiko, to Fuji Photo Film Co., Ltd. Heat transfer dye-receiving sheet. 4,886,775, Cl. 503-227.000.
Kubota, Ltd.: *See*—
Nakamura, Tadashi; Fujita, Satoshi; and Ishida, Eiichi, 4,886,135, Cl. 180-68.100.
Kudo, Hiroko: *See*—
Mitsuhashi, Shigeru; Kondo, Hitoshi; Okazaki, Tetsuharu; Endoh, Shinji; Kudo, Hiroko; Yamaguchi, Akio; Tsuruta, Haruki; and Akutagawa, Susumu, 4,886,623, Cl. 252-299.650.
Kudo, Yoshinobu; and Yoshida, Kiyohiro, to Minolta Camera Kabushi Kaisha. Photographic lens device. 4,886,342, Cl. 350-252.000.
Kudo, Yoshinobu: *See*—
Inoue, Manabu; Taniguchi, Nobuyaki; Hata, Yoshiaki; Hoda, Takeo; Kudo, Yoshinobu; and Ueda, Hiroshi, 4,887,115, Cl. 354-289.100.
Nakamura, Ikushi; Ootsuka, Hiroshi; Fukushima, Akira; Kudo, Yoshinobu; Hata, Yoshiaki; Inoue, Manabu; and Inoue, Norihiro, 4,887,107, Cl. 354-195.120.
Taniguchi, Nobuyuki; Hoda, Takeo; Hata, Yoshiaki; Inoue, Manabu; Kudo, Yoshinobu; and Ueda, Hiroshi, 4,887,108, Cl. 354-195.100.
Kuehne, Norbert; Raehse, Wilfried; and Carduck, Franz-Josef, to Henkel Kommanditgesellschaft auf Aktien. Process for the separation of biotechnologically produced valuable materials from a fermenter broth by crossflow micro- and/or ultrafiltration. 4,886,602, Cl. 210-637.000.
Kuma, Tosimi; and Okano, Hiroshi, to Kabushiki Kaisha Seibu Giken. Active gas adsorbing element and method of manufacturing. 4,886,769, Cl. 502-62.000.
Kumagai, Chiaki; Juman, Shinji; Kimura, Yutaka; and Mitomo, Haruhito, to Honda Giken Kogyo Kabushiki Kaisha. Method of examining operation of electronic control system for internal combustion engines. 4,887,215, Cl. 364-431.040.
Kumar, Rakesh: *See*—
Kotliar, Abraham M.; Sacks, William; Sibilia, John P.; and Kumar, Rakesh, 4,886,689, Cl. 428-35.700.
Kummerlen, Donald R. Clothes hanging stand. 4,886,172, Cl. 211-87.000.
Kunsman, Donald R., to Victaulic Company of America. Abrasive grip pipe coupling. 4,886,304, Cl. 285-104.000.
Kurakake, Mitsuo; and Sakamoto, Keiji, to Fanuc Ltd. Position control system. 4,887,015, Cl. 318-609.000.
Kuraray Company, Ltd.: *See*—
Onishi, Takashi; Suzuki, Shigeaki; Mori, Toshiki; Fujii, Hiroshi; and Fujita, Yoshiji, 4,886,916, Cl. 568-34.000.
Tanaka, Yasuyuki; Ibata, Koichi; Mizuno, Masao; Ninagawa, Yoichi; and Nishida, Takashi, 4,886,904, Cl. 560-249.000.
Kuratani, Junichi, to Alps Electric Co., Ltd. Dimmer control circuit. 4,887,006, Cl. 315-209.00R.
Kureha Kagaku Kogyo K. K.: *See*—
Ota, Masanori; Akutsu, Fumio; and Takahashi, Kazuo, 4,886,857, Cl. 525-74.000.
Satake, Yoshikatsu; Kaneko, Takashi; Kobayashi, Yutaka; Iizuka, Yo; Katto, Takayuki; and Shiiki, Zenya, 4,886,871, Cl. 528-226.000.
Kurozumi, Seizi: *See*—
Noyori, Ryoji; Suzuki, Masaaki; Yanagisawa, Akira; and Kurozumi, Seizi, 4,886,903, Cl. 560-121.000.
Kusunoki, Shigeru: *See*—
Matsumoto, Takahiro; Suenaga, Haruo; Maehara, Naoyoshi; Sakamoto, Kazuho; Niwa, Takashi; Bessyo, Daisuke; Kusunoki, Shigeru; and Shitaya, Takao, 4,886,951, Cl. 219-10.55B.
Kuwajima, Goro: *See*—
Asaka, Junichiro; Fujiwara, Tamio; Fujiwara, Takashi; Kuwajima, Goro; Kondo, Eiji; and Shin, Masaru, 4,886,748, Cl. 435-69.700.
Kuwamura, Shinichi; and Ooka, Masataka, to Dainippon Ink and Chemicals, Inc. Resin composition. 4,886,862, Cl. 526-247.000.
Kuzyk, Andrew, to Tetrad Marketing/Sales Ltd. Interlock system for ready to assemble furniture, and furniture incorporating such system. 4,886,326, Cl. 312-257.100.
Labaton, Isaac J.; and Harats, Yehuda. Hydrogen pump. 4,886,048, Cl. 165-104.270.
Lacroix, Guy: *See*—
Borrod, Guy; and Lacroix, Guy, 4,886,542, Cl. 71-087.000.
L'Air Liquide: *See*—
Hirase, Ikuo; and Rufin, Denis, 4,886,444, Cl. 431-5.000.
Laitram Corporation, The: *See*—
Lapeyre, James M., 4,886,158, Cl. 198-853.000.
Lalancette, Jean-Marc; Menard, Hugues; and Potvin, Estelle, to Universite De Sherbrooke. Phosphate bonded composite electrodes. 4,886,591, Cl. 204-291.000.
Lalonde, Eugene L.; Bruynesteyn, Michael R.; and Unger, Thomas M., to Aqua Trend Systems Inc. Apparatus for filtering, retaining and disposal of waste water accumulated on a boat. 4,886,607, Cl. 210-739.000.
Lambert, Blair W., to Space Age Enterprises, Inc. Insole. 4,885,849, Cl. 36-3.00B.
Lambert, John E., to Gas Research Institute. Internal combustion engine control system. 4,886,034, Cl. 123-587.000.
Lambert, Robert W.; Martin, Joseph A.; and Thomas, Gareth J., to Hoffmann-La Roche Inc. Pyrimidine derivatives, pharmaceutical compositions and method of using same. 4,886,785, Cl. 514-50.000.
Lambert, Susan L.: *See*—
Sachtler, J. W. Adriaan; Lawson, R. Joe; and Lambert, Susan L., 4,886,927, Cl. 585-48.100.
Landis & Gyr Metering, Inc.: *See*—
Voisine, John T.; and Joder, Andy, 4,887,028, Cl. 324-142.000.

Landy, Michael A., to Fatigue Technology, Incorporated. Fatigue life enhancement of dovetail connector slots and noncircular openings. 4,885,829, Cl. 29-156.80R.

Lang, Robert W.; and Klingert, Bernd, to Ciba-Geigy Corporation. Process for the preparation of trifluorodichloroethyl-substituted acids and zinc compounds. 4,886,879, Cl. 540-486.000.

Langdon, Roger M.; and Smith, Cyril, to General Motors Corporation. Magnetometer having coil formed by two spiral shaped conductors. 4,887,033, Cl. 324-253.000.

Langer, Robert S.: *See—*
D'Amore, Patricia; Leong, Kam W.; and Langer, Robert S., 4,886,870, Cl. 528-206.000.

Langslet, Eric B. Ball capturing tennis net assembly. 4,886,268, Cl. 273-29.00A.

Lantz, Kim: *See—*
Carden, Matthew J.; Lantz, Kim; Reh, Theresa L.; Trytten, Anne; and Lubino, Yves, 4,887,260, Cl. 370-60.000.

Lanxide Technology Company, LP: *See—*
Dwivedi, Ratnesh K., 4,886,766, Cl. 501-87.000.

Lapeyre, James M., to Laitram Corporation, The. Modular center drive conveyor belt. 4,886,158, Cl. 198-853.000.

Larkins, Brian; Cuellar, Richard E.; Wallace, John C.; and Galili, Gad, to Lubrizol Genetics, Inc.; and Purdue Research Foundation, Inc. Modified zein genes containing lysine. 4,886,878, Cl. 536-26.000.

Larkins, Thomas H., Jr., to Eastman Kodak Company. Preparation of ethyl acetate. 4,886,905, Cl. 560-265.000.

Larson, Donna J. Garment security device. 4,885,920, Cl. 70-49.000.

Larson, Wayne F.: *See—*
Barrett, Philip D.; Henderson, Walter G.; and Larson, Wayne F., 4,887,292, Cl. 379-103.000.

Lattice Semiconductor Corporation: *See—*
Turner, John E., 4,887,239, Cl. 365-185.000.

Launay, Michele: *See—*
Bru-Magniez, Nicole; Teulon, Jean-Marie; and Launay, Michele, 4,886,805, Cl. 514-253.000.

Lavezzi, Roberto: *See—*
Giorgetti, Alberto; and Lavezzi, Roberto, 4,886,323, Cl. 303-113.000.

Lavielle, Gilbert; and Lepagnol, Jean, to Adir Et Cie. Acetamides derived from 2,3-dihydro-3-phenyl-2-benzofuranone. 4,886,799, Cl. 514-233.500.

Law, Kock-Yee; and Bailey, F. Courtney, to Xerox Corporation. Photoconductive imaging members with unsymmetrical squaraine compositions. 4,886,722, Cl. 430-59.000.

Lawrence, George W.; and Moss, C. William, to Omar, Inc. Panelized fabric covered structure. 4,886,084, Cl. 135-103.000.

Lawrence, Peter J.: *See—*
Neve, Brian D.; Lawrence, Peter J.; and Owen, Lyndon N., 4,887,266, Cl. 370-95.100.

Lawson, R. Joe: *See—*
Sachtler, J. W. Adriaan; Lawson, R. Joe; and Lambert, Susan L., 4,886,927, Cl. 585-48.100.

Lazarus, Harrison M. External guide wire. 4,886,500, Cl. 604-164.000.

Le, Hanh T., to Conoco, Inc. Oil compositions containing terpolymers of alkyl acrylates or methacrylates, an olefinically unsaturated homo or heterocyclic-nitrogen compound and allyl acrylates or methacrylates or perfluoroalkyl ethyl acrylates or methacrylates. 4,886,520, Cl. 44-62.000.

Leal, Vitervo. Simulated frog fishing lure. 4,885,867, Cl. 43-42.260.

Lear Siegler Seating Corp.: *See—*
Kozlowski, Eric F., 4,885,828, Cl. 29-91.500.

Lee, Chang H.; and Kim, Young J. Automatic mixing faucet. 4,886,207, Cl. 236-12.120.

Lee, Jang B.: *See—*
Lee, Youn S., 4,887,198, Cl. 363-18.000.

Lee, John: *See—*
Gustafson, Eric K.; Trebino, Rick; and Lee, John, 4,886,761, Cl. 436-518.000.

Lee, Song Y.: *See—*
Kortright, Kenneth H.; Hofheinz, David E.; Forman, Meryl A.; Lee, Song Y.; Smariga, Paulette E.; and Stoner, Candie S., 4,886,742, Cl. 435-5.000.

Lee, Stan Y. C.: *See—*
Willis, Mark E.; Ranganayaki, Rambabu P.; Shirley, Thomas E.; and Lee, Stan Y. C., 4,887,244, Cl. 367-73.000.

Lee, Wilson. Portable trolley barbecue. 4,885,988, Cl. 99-449.000.

Lee, Youn S., to Lee, Jang B. Electronic large current switch for a single power circuit. 4,887,198, Cl. 363-18.000.

Lefakis, Haralambos: *See—*
Clabes, Joachim G.; Hahn, Peter O.; Ho, Paul S.; Lefakis, Haralambos; and Rubloff, Gary W., 4,886,681, Cl. 427-38.000.

Leflet, David. Two-position signal device. 4,885,857, Cl. 40-533.000.

Leggett, Henry H.; and Kitney, Howard R., to Eastern Oil Tools PTE Ltd. Wireline safety mechanism for wireline tools. 4,886,115, Cl. 166-77.000.

Lehmann, Martin: *See—*
Weiss, Hardy P., 4,887,229, Cl. 364-557.000.

Leiber, Heinz; Ohnemuller, Hans-Joachim; and Kastner, Klaus, to Daimler Benz AG. Device for controlling the drive torque of a motor vehicle. 4,886,140, Cl. 180-197.000.

Leier, Wolfgang: *See—*
Bachmann, Paul; Berges, Hanns-Peter; and Leier, Wolfgang, 4,886,599, Cl. 210-287.000.

Leishear, Robert A.: *See—*
Scott, William T.; and Leishear, Robert A., 4,886,463, Cl. 439-89.000.

Lentini, Salvatore; and Patti, Giuseppe, to Italtel Societa Italiana. Synchronizing circuit for a plurality of power units. 4,886,981, Cl. 307-87.000.

Lenz, Kenneth, to Frommelt Industries, Inc. Bottom seal for L-pad dock shelter. 4,885,881, Cl. 52-173.0DS.

Lenz, Michael, to Siemens Aktiengesellschaft. Circuit for temperature protection with hysteresis. 4,887,181, Cl. 361-103.000.

Lenz, William; Patel, Arvind; and Tomkiewicz, Thaddeus, to Molex Incorporated. Strain relief structure for connecting flat flexible cable to a circuit board. 4,886,942, Cl. 174-135.000.

Leon, Michael A., to FMC Corporation. Loader platform interface control and stop means. 4,886,413, Cl. 414-495.000.

Leong, Kam W.: *See—*
D'Amore, Patricia; Leong, Kam W.; and Langer, Robert S., 4,886,870, Cl. 528-206.000.

Lepagnol, Jean: *See—*
Lavielle, Gilbert; and Lepagnol, Jean, 4,886,799, Cl. 514-233.500.

Leukel, Gabriele: *See—*
Mormann, Werner; and Leukel, Gabriele, 4,886,902, Cl. 560-106.000.

Leung, Chung W.: *See—*
Chen, Min-Liang; Leung, Chung W.; Lu, Chih-Yuan; and Tsai, Nun-Sian, 4,886,765, Cl. 437-200.000.

Leupold, Herbert A., to United States of America, Army. Periodic permanent magnet structures. 4,887,058, Cl. 335-216.000.

Leveugle, Jean, to Reel S A. Load compensating device for a handling machine and process for carrying out such compensation. 4,886,174, Cl. 212-149.000.

Levin, Steven B.: *See—*
Fellows, Constance A.; Hecht, Patrick G.; and Levin, Steven B., 4,886,913, Cl. 564-255.000.

Levine, Norman. Skateboard handle. 4,886,297, Cl. 280-809.000.

Lewin, David F., to Owens-Corning Fiberglas Corporation. Method of using evenly distributed air flow to condition glass filaments prior to application of sizing. 4,886,536, Cl. 65-3.100.

Leybold AG: *See—*
Bachmann, Paul; Berges, Hanns-Peter; and Leier, Wolfgang, 4,886,599, Cl. 210-287.000.

Leybold Aktiengesellschaft: *See—*
Anderle, Friedrich; Costescu, Dan L.; Kempf, Stefan; Novak, Emmerich; and Zejda, Jaroslav, 4,886,592, Cl. 204-298.000.

Leyshon, David W., to Atlantic Richfield Company. Thin bed cofeed reaction system for methane conversion. 4,886,932, Cl. 585-500.000.

Li, Edward E.: *See—*
Lill, Mark P.; Li, Edward E.; and Sun, Koushun, 4,886,029, Cl. 123-479.000.

Libert, James T., to Square D Company. Line to line to line to neutral converter. 4,887,018, Cl. 318-778.000.

Licciardi, James P.: *See—*
Licciardi, Terrence P.; and Licciardi, James P., 4,886,267, Cl. 273-26.00R.

Licciardi, Terrence P.; and Licciardi, James P. Baseball practice apparatus. 4,886,267, Cl. 273-26.00R.

Lichtblau, Leo, to Kloeckner-Humboldt-Deutz AG. Blower for delivering cooling air to internal combustion engines. 4,886,418, Cl. 415-912.000.

Lieb, Folker: *See—*
Niewohner, Ulrich; Hoever, Franz-Peter; Lieb, Folker; Rosentreter, Ulrich; Perzborn, Elisabeth; Fiedler, Volker-Bernd; and Seuter, Friedel, 4,886,898, Cl. 560-42.000.

Liegel, Reinald D.: *See—*
Eck, Leonard; Liegel, Reinald D.; Naber, Charles; and Sabel, Garry J., 4,886,242, Cl. 254-8.00B.

Ligotti, Carlo: *See—*
Jandeska, William F., Jr.; Rezhets, Vadim; and Ligotti, Carlo, 4,886,637, Cl. 419-12.000.

Ligtenberg, Adrianus: *See—*
Cash, Glenn L.; Hatamian, Mehdi; and Ligtenberg, Adrianus, 4,887,233, Cl. 364-757.000.

Lill, Mark P.; Li, Edward E.; and Sun, Koushun, to Motorola Inc. Ignition misfire detector. 4,886,029, Cl. 123-479.000.

Lilly Industries Limited: *See—*
Baker, Stephen R.; and Todd, Alec, 4,886,885, Cl. 514-381.000.

Lin, Eric: *See—*
Yee, David T.; Lin, Eric; and Yee, Fang-Tung, 4,886,289, Cl. 280-643.000.

Lin, Jiang-Jen; and Speranza, George P., to Texaco Chemical Company. Novel compositions from polyoxyalkylene amines and epoxides. 4,886,867, Cl. 528-111.000.

Lin, Jiang-Jen; and Speranza, George P., to Texaco Chemical Company. Aromatic amine terminated trifunctional polyoxyalkylene urea. 4,886,909, Cl. 564-50.000.

Lin Pac Mouldings Limited: *See—*
Haines, Peter R., 4,886,181, Cl. 220-67.000.

Lindsauer Dornier Gesellschaft mbH: *See—*
Strudel, Werner, 4,885,826, Cl. 26-80.000.

Lindner, Charles E., to Carriere, Ron, a part interest. Combination backpack and cot. 4,885,812, Cl. 5-113.000.

Lindoerfer, Walter: *See—*
Jahn-Held, Wilhelm; Lindoerfer, Walter; and Wartenpfuhl, Friedel, 4,886,393, Cl. 405-128.000.

Lindsay, John W.: *See—*
Rush, Hughey A.; Hibbard, Billy B.; Pursoo, Johnson L.; Lindsay, John W.; Smith, Thomas E.; Harper, Kenneth; Tullos, MIchael V.; and Davis, James E., 4,886,706, Cl. 428-288.000.

Lindsey, William J.: *See—*
Patton, William E.; and Lindsey, William J., 4,886,507, Cl. 604-284.000.

Lindstrom, Richard L.; and Skelnik, Debra L. Additive for irrigation solution or surgical solution. 4,886,786, Cl. 514-54.000.

Linhart, Joseph J.: *See—*
Hoffman, Donald B.; Linhart, Joseph J.; and Stoces, Raymond C., 4,886,247, Cl. 266-246.000.

Linick, James. Infra red imaging system. 4,886,330, Cl. 350-6.500.

Linke, Siegfried W.: *See—*
Zerbes, Rudolf; Linke, Siegfried W.; and Mohrmann, Karl H., 4,886,892, Cl. 549-519.000.

Linnau, Yendra: *See—*
Eibl, Johann; Linnau, Yendra; and Schwarz, Otto, 4,886,758, Cl. 435-269.000.

Liou, Fu-Tai: *See—*
Miller, Robert O.; and Liou, Fu-Tai, 4,886,764, Cl. 437-200.000.

Lisec, Peter. Apparatus for the production of spacer frames. 4,885,926, Cl. 72-306.000.

Lisec, Peter. Process and apparatus for filling an insulating glass unit with filler gas. 4,886,095, Cl. 141-4.000.

Lisec, Peter. Apparatus for the manipulation of spacer frames. 4,886,410, Cl. 414-27.000.

Litens Automotive Partnership: *See—*
Hanes, David A., 4,886,484, Cl. 474-135.000.

Liu, Yaguang. Pharmaceutical composition for inhibiting viruses and increasing immune function (PII). 4,886,666, Cl. 424-195.100.

Ljung, Bo H. G., to Kearfott Guidance & Navigation Corporation. Ring laser gyroscope beam combiner for separating and combining circulating laser beams for power and fringe pattern detections. 4,886,364, Cl. 356-350.000.

Loctite Corporation: *See—*
Drain, Kieran F.; and Kadziela, Kris, 4,886,842, Cl. 522-103.000.

Loewenstein, Lee M.: *See—*
Davis, Cecil J.; Matthews, Robert T.; Loewenstein, Lee M.; Jucha, Rhett B.; Hildenbrand, Randall C.; and Jones, John I., 4,886,570, Cl. 156-643.000.

Loewenthal, Bernard; and Thatcher, G. Lawrence, to Loewenthal, Bernard. Dental probe. 4,886,454, Cl. 433-72.000.

Logan, Shawn M.: *See—*
Embree, David M.; and Logan, Shawn M., 4,887,053, Cl. 331-116.0FE.

Login, Robert B.: *See—*
Chaudhuri, Ratan K.; Tracy, David J.; and Login, Robert B., 4,886,890, Cl. 548-519.000.

Logsdon, John E.: *See—*
Vera-Castaneda, Ernesto; and Logsdon, John E., 4,886,919, Cl. 568-885.000.

Logullo, Francis M.: *See—*
Gay, Frank P.; Logullo, Francis M.; Luise, Robert R.; and Mack, Mark P., 4,886,875, Cl. 525-439.000.

Lohn, Gerd, to Kaltenbach & Voigt GmbH & Co. Dental spray handpiece. 4,886,452, Cl. 433-32.000.

Lohn, Gerd, to Kaltenbach & Voigt GmbH & Co. Dental spray handpiece. 4,886,455, Cl. 433-80.000.

Lohr, Herbert; Stein, Bernd; Becker, Helmut; Ade, Reiner; and Baur, Walter, to Rovema Verpackungsmaschinen GmbH. Driving method and system for controlling a tubular-bag machine. 4,885,900, Cl. 53-551.000.

Lohr Industrie, S.A.: *See—*
Donnard, Rene, 4,886,694, Cl. 428-137.000.

Lon-Jeng, Lin. Learning aid to enlighten intelligence for children. 4,886,457, Cl. 434-191.000.

Lopotar, Nevenka: *See—*
Djokic, Slobodan; Lopotar, Nevenka; Kobrehel, Gabrijela; Krnjevic, Hrvoje; and Carevic, Olga, 4,886,792, Cl. 514-183.000.

L'Oreal: *See—*
Bugaut, Andree; Junino, Alex; and Cotteret, Jean, 4,886,517, Cl. 8-416.000.

Lorenzo, Luis P.: *See—*
Menendez, Francisco J. S.; Menendez, Fernando M. S.; De La Cuadra Herrera, Antonio; Tamargo, Francisco A.; Lorenzo, Luis P.; Valcarcel, Matias R.; and Fernandez, Vicente A., 4,886,648, Cl. 423-92.000.

Lortz, James L., to Food Equipment Engineering, Inc. Apparatus for forming three dimensional food products. 4,886,441, Cl. 425-236.000.

Loughlin, Bernard D., to Hazeltine Corporation. Apparatus for processing stereo signals and universal AM stereo receivers incorporating such apparatus. 4,887,297, Cl. 381-15.000.

Loughlin, Robert W.; and Loughlin, Thomas G. Sliding shackle padlock. 4,885,919, Cl. 70-34.000.

Loughlin, Thomas G.: *See—*
Loughlin, Robert W.; and Loughlin, Thomas G., 4,885,919, Cl. 70-34.000.

Love, Marvin L., Jr.: *See—*
Salamy, Thomas E.; Love, Marvin L., Jr.; and Towner, Mark E., 4,886,728, Cl. 430-331.000.

Lovel, Craig G.: *See—*
Watson, Keith G.; and Lovel, Craig G., 4,886,911, Cl. 564-221.000.

Lovgren, Eric M.; and El-Tibi, Abdul-Kader A., to Baxter Travenol Laboratories, Inc. Soft tip catheter. 4,886,506, Cl. 604-280.000.

Lovley, Derek R., to United States of America, Interior. Microbial production of ultrafine-grained magnetite. 4,886,752, Cl. 435-168.000.

Lowrie, Amy L.: *See—*
Hodgens, Thomas A.; Lowrie, Amy L.; and Murphy, James R., 4,887,301, Cl. 382-9.000.

Lu, Chih-Yuan: *See—*
Chen, Min-Liang; Leung, Chung W.; Lu, Chih-Yuan; and Tsai, Nun-Sian, 4,886,765, Cl. 437-200.000.

Lubino, Yves: *See—*
Carden, Matthew J.; Lantz, Kim; Reh, Theresa L.; Trytten, Anne; and Lubino, Yves, 4,887,260, Cl. 370-60.000.

Lubrizol Genetics, Inc.: *See—*
Larkins, Brian; Cuellar, Richard E.; Wallace, John C.; and Galili, Gad, 4,886,878, Cl. 536-26.000.

Lucas Industries, public limited company: *See—*
Davies, Stephen H., 4,886,154, Cl. 192-141.000.

Lucas, Thomas H., to Schweiger Industries, Inc. Spring structure for cushion seating. 4,886,250, Cl. 267-95.000.

Lucassen, Guenter: *See—*
Pinto, Akiva; Lucassen, Guenter; and Schmidt, Reinhard, 4,887,070, Cl. 340-561.000.

Luchterhand, Ralph E.: *See—*
Records, Robert A.; Luchterhand, Ralph E.; and Detroit, John F., 4,886,156, Cl. 198-692.000.

Lucid, Michael F.: *See—*
Van Meurs, Peter; De Rouffignac, Eric P.; Vinegar, Harold J.; and Lucid, Michael F., 4,886,118, Cl. 166-245.000.

Ludwiga, Horst. Building kit for an apparatus for manufacturing total prostheises for upper and lower jaws. 4,886,453, Cl. 433-54.000.

Luise, Robert R.: *See—*
Gay, Frank P.; Logullo, Francis M.; Luise, Robert R.; and Mack, Mark P., 4,886,875, Cl. 525-439.000.

Luke, Charles M.; and Wilson, John B., to Scientific Atlanta, Inc. Method and apparatus for making phase stable microwave measurements. 4,887,313, Cl. 455-612.000.

Lumex, Inc.: *See—*
Martin, Matt, 4,885,939, Cl. 73-379.000.

Lun, Saiman, to General Motors Corporation. Hydraulic engine mount with integral hydraulic chambers and diaphragm. 4,886,253, Cl. 267-140.100.

Lunkenheimer, Winfried: *See—*
Gayer, Herbert; Jelich, Klaus; Lunkenheimer, Winfried; Brandes, Wilhelm; and Hanssler, Gerd, 4,886,833, Cl. 514-521.000.

Lutz, Christian, to Etablissement Supervis. Preloaded drive assembly. 4,886,480, Cl. 464-112.000.

Lutz, Manfred, to Fichtel & Sachs AG. Locking drive for a central locking system. 4,885,922, Cl. 70-264.000.

Lutze, Norbert, to Daimler-Benz AG. Air filter casing of an internal combustion engine. 4,886,531, Cl. 55-244.000.

Lux, Herbert: *See—*
Noe, Oskar; Noe, Rolf; Noe, Andreas; Dotsch, Willi; and Lux, Herbert, 4,886,199, Cl. 226-118.000.

Lynch, James P. Reinforcement member for an extendible scissors truss. 4,885,891, Cl. 52-646.000.

M. L. Laboratories PLC: *See—*
Milner, Jeremiah, 4,886,789, Cl. 514-60.000.

MacDiarmid, Joan E.: *See—*
Bardos, Thomas J.; Perlman, Michael E.; and MacDiarmid, Joan E., 4,886,790, Cl. 514-83.000.

MacGregor, Douglas B.; Moyer, William C.; Zolnowsky, John E.; and Mothersole, David S., to Motorola, Inc. Microcoded processor executing microroutines with a user specified starting microaddress. 4,887,203, Cl. 364-200.000.

Macht, Egid; and Hagel, Thomas, to FAG Kugelfischer Georg Schafer (KGaA). Braking-power boosters with noise suppression. 4,885,979, Cl. 91-369.100.

Mack, Mark P.: *See—*
Gay, Frank P.; Logullo, Francis M.; Luise, Robert R.; and Mack, Mark P., 4,886,875, Cl. 525-439.000.

MacKay, Kenneth D.: *See—*
Tuominen, Francis W.; Swanson, Ronald R.; Mattison, Phillip L.; MacKay, Kenneth D.; and Glorvigen, Bradley W., 4,886,888, Cl. 548-497.000.

Mackey, Gary T., to American Ball Manufacturing, Corp. Golf ball. 4,886,277, Cl. 273-232.000.

Mackintosh, Christine: *See—*
Paffhausen, Hans; Hogarth, Ian; Scott, Andrew; and Mackintosh, Christine, 4,886,386, Cl. 400-241.400.

Mac Thornock, Jeffrey: *See—*
Keate, Christopher R.; and Mac Thornock, Jeffrey, 4,887,042, Cl. 328-133.000.

Maeda, Hiroaki; and Nakamura, Masahiko, to Aisin Seiki Kabushiki Kaisha. Control system for automatic transmission. 4,885,960, Cl. 74-866.000.

Maeda, Ryoji, to Nissan Motor Co., Ltd. Front structure for automotive vehicles. 4,886,314, Cl. 296-192.000.

Maeda, Takuya; Murakami, Keikichi; Yamada, Tsutomu; Kishimoto, Mitsuharu; Yajima, Kenichi; and Takemura, Yoshihiko, to Kawasaki Jukogyo Kabushiki Kaisha. Metal-making apparatus involving the smelting reduction of metallic oxides. 4,886,246, Cl. 266-157.000.

Maehara, Naoyoshi: *See—*
Matsumoto, Takahiro; Suenaga, Haruo; Maehara, Naoyoshi; Sakamoto, Kazuho; Niwa, Takashi; Bessyo, Daisuke; Kusunoki, Shigeru; and Shitaya, Takao, 4,886,951, Cl. 219-10.55B.

Maeshima, Katsuyoshi, to Canon Kabushiki Kaisha. Image processing apparatus. 4,887,163, Cl. 358-443.000.

Maget, Henri J. R., to IVAC Corporation. Electrochemically driven drug dispenser. 4,886,514, Cl. 604-891.100.

Magori, Valentin, to Siemens Aktiengesellschaft. Ultrasound flow rate meter using a phase difference method and apparatus. 4,885,942, Cl. 73-861.280.

Mahapatra, Amaresh, to Polaroid Corporation. Process for tapering waveguides. 4,886,538, Cl. 65-30.130.

Maier, Hans P., to Agintec AG. Displacement machine having spiral chamber and displacement member of increasing radial widths. 4,886,433, Cl. 418-55.000.

Maier-Lehner, Franz: *See*—
Schnell, Peter; Maier-Lehner, Franz; and Spaun, Rudiger;, 4,886,684, Cl. 427-370.000.

Maki, Melvin C.; Feller, Walter J.; and Adams, Edward L., to Control Data Canada Limited. Perimeter intrusion detection system with block ranging capabilities. 4,887,069, Cl. 340-552.000.

Maldague, Pierre E. Process and apparatus for aerodynamic separation of components of a gaseous stream. 4,886,523, Cl. 55-1.000.

Male, Andrew J., to Westinghouse Electric Corp. Modular option deck assembly. 4,887,055, Cl. 335-6.000.

Malick, Franklin S., to Viking Systems International, Inc. Portable robot with automatic set-up. 4,887,016, Cl. 318-568.130.

Malin Research Corporation: *See*—
Davidson, James G.; Allard, Deborah A.; Sawyer, Philip J.; and Boynton, Philip E., 4,886,522, Cl. 44-624.000.

Malleron, Jean-Luc; Ponsinet, Gerard; and Roussel, Gerard, to Rhone-Poulenc Sante. Alkadiene derivatives, their preparation, and pharmaceutical compositions containing them. 4,886,835, Cl. 514-532.000.

Mallinckrodt, Inc.: *See*—
Cantrell, Gary L., 4,886,920, Cl. 570-141.000.

Malott, Michael W., to 3-D Dan, Inc. Passive, reusable device for amusement or for warning. 4,886,687, Cl. 428-4.000.

Malson, Thomas: *See*—
de Belder, Anthony N.; and Malson, Thomas, 4,886,787, Cl. 514-57.000.

Man Design Co., Ltd.: *See*—
Osada, Toshio; and Tanabe, Masaaki, 4,886,429, Cl. 417-413.000.

Man-Gill Chemical Company: *See*—
Tittle, Douglas L., 4,886,590, Cl. 204-232.000.

Manabe, Mitsuo: *See*—
Karube, Norio; Egawa, Akira; Yamazaki, Etsuo; Iehisa, Nobuaki; and Manabe, Mitsuo, 4,887,272, Cl. 372-38.000.

Mannesmann Aktiengesellschaft: *See*—
Horbach, Rainer; and Osthoff, Hermann, 4,886,285, Cl. 280-43.140.

Mano, Hiroshi; Tsurusaki, Masayuki; Sano, Yoshikazu; and Shiomi, Junichi, to Kabushiki Kaisha Toshiba. Digital key telephone system. 4,887,264, Cl. 370-58.200.

Mansour, James D.: *See*—
Haynes, John L.; and Mansour, James D., 4,886,505, Cl. 604-265.000.

Manville Corporation: *See*—
Bainbridge, David W., 4,886,696, Cl. 428-184.000.
Rohweder, Theodore R.; and Ray, Richard J., Jr., 4,886,561, Cl. 156-102.000.

Manzo, Louis. Interlocking pivot device for adjustable ballusters. 4,886,245, Cl. 256-67.000.

MAP Mikrofilm Apparatebau, Dr. Poehler GmbH & Co. KG: *See*—
Dziemba, Peter, 4,886,329, Cl. 350-6.500.

Maras, Siegfried: *See*—
Gruber, Harald; Richter, Andreas M.; Fanghanel, Egon; Roth, Hans-Klaus; Friedrich, Heinz; and Maras, Siegfried, 4,886,627, Cl. 252-513.000.

Marchal, Daniel, to Eurofloor S.A. Process for the manufacturing of synthetic coverings having improved resistance to soiling, and synthetic covering obtained thereby. 4,886,708, Cl. 428-447.000.

Marchus, L. Mark: *See*—
Jones, John A.; Marchus, L. Mark; and Hardy, Loren S., 4,886,230, Cl. 248-170.000.

Marcker, Kjeld A.; and Jensen, Jens S., to A/S De Danske Sukkerfabrikker. Method for the expression of genes in plants, parts of plants, and plant cell cultures, and DNA fragments, plasmids, and transformed microorganisms to be used when carrying out the method, as well as the use thereof for the expression of genes in plants,. 4,886,753, Cl. 435-172.300.

Mardones Parra, Wladimir A.: *See*—
Saphores Wiedmaier, Eugenio A.; Gleisner Klempau, Arturo G.; Vega de Kuyper, Juan C.; and Mardones Parra, Wladimir A., 4,886,595, Cl. 209-166.000.

Marek, Jiri, to Setec Messgerate Gesellschaft m.b.H. Capacitive obstacle detector for vehicles in reverse gear. 4,887,066, Cl. 340-436.000.

Margelli, Gian F.: *See*—
Cuffiani, Illaro; Fabbri, Roberto; Margelli, Gian F.; and Zucchini, Umberto, 4,886,770, Cl. 502-104.000.

Marhold, Albrecht: *See*—
Franckowiak, Gerhard; Marhold, Albrecht; Bechem, Martin; Gross, Rainer; Kayser, Michael; Schramm, Matthias; and Thomas, Gunther, 4,886,816, Cl. 514-338.000.
Sirrenberg, Wilhelm; Marhold, Albrecht; and Wachendorff-Neumann, Ulrike, 4,886,823, Cl. 514-364.000.

Markessini, Andrew C.: *See*—
Markessini, Efthalia V.; and Markessini, Andrew C., 4,886,854, Cl. 524-14.000.

Markessini, Efthalia V.; and Markessini, Andrew C., to ENIGMA, NV. Substitute for amino and phenolic resins. 4,886,854, Cl. 524-14.000.

Marks, George B., Sr.; and Fearing, D. Michael, to Fearing Manufacturing Co., Inc. Antibacterial attachment. 4,885,855, Cl. 40-301.000.

Marley, Clement F. Guard and guide for corn cutters. 4,885,842, Cl. 30-121.500.

Marocco, Claude C. A. Table tennis practice aid. 4,886,269, Cl. 273-30.000.

Marom, Itsak: *See*—
Kirson, Yoram; and Marom, Itsak, 4,885,977, Cl. 89-41.050.

Mars G.B. Limited: *See*—
Seward, Barry; and Pope, Kevin C., 4,886,674, Cl. 426-79.000.

Marshall, Robert M., to Allied Signal Inc. Polyamide yarn with nonyellowing antioxidant finish. 4,886,707, Cl. 428-395.000.

Martikainen, Antti: *See*—
Aaltonen, Olli; Martikainen, Antti; Rantala, Borje; Ekstrom, Jan; and Toikka, Osmo, 4,886,528, Cl. 55-158.000.

Martin, Carl E., to Fibercast Company. Double containment pipe fittings and apparatus to adhesively install the same. 4,886,305, Cl. 85-133.100.

Martin, Joseph A.: *See*—
Lambert, Robert W.; Martin, Joseph A.; and Thomas, Gareth J., 4,886,785, Cl. 514-50.000.

Martin, Matt, to Lumex, Inc. Dynamometer for testing eccentric contractions and concentric contractions with free-limb acceleration. 4,885,939, Cl. 73-379.000.

Martin, Roland: *See*—
Kroniger, Wilhelm; Martin, Roland; and Aydt, Guenter, 4,886,147, Cl. 188-73.370.

Martinez, Antonio, Jr., to Atel Corporation. Dolly for supporting objects with adjustable height and inclination. 4,886,284, Cl. 280-43.120.

Martinez, Beatrice E. Disposable container with foldable spout. 4,886,206, Cl. 229-123.100.

Martini, James A.: *See*—
Westfall, Norman R.; Martini, James A.; and Habbersett, John I., 4,885,871, Cl. 49-176.000.

Martinou, Robert L.; and Ruimi, Michel M., to Societe Nationale d'Etude et de Construction de Moteurs d'Aviation "S.N.E.C.M.A." . Formation of protective coatings by electrolytic codeposition of a nickel-cobalt matrix and ceramic particles. 4,886,583, Cl. 204-16.000.

Martinou, Robert L.; and Ruimi, Michel M., to Societe Nationale d'Etude et de Construction de Moteurs d'Aviation"S.N.E.C.M.A." . Electrolytic process for applying thin silver coatings to stainless steel, particularly in bearing races. 4,886,585, Cl. 204-23.000.

Maruta, Akira; and Motoyama, Ryouichi, to Kanai Juyo Kogyo Co., Ltd. Ring for spinning machinery. 4,885,905, Cl. 57-119.000.

Marx, Arthur F.: *See*—
Bertola, Mauro A.; Marx, Arthur F.; Koger, Hein S.; Quax, Wilhelmus J.; Van der Laken, Cornelis J.; Phillips, Gareth T.; Robertson, Brian W.; and Watts, Peter D., 4,886,750, Cl. 435-136.000.

Marx, Paul: *See*—
Berthold, Werner; Marx, Paul; and Ohlschlager, 4,886,737, Cl. 430-372.000.

Masaki, Kenji; Osawa, Izumi; Fujiwara, Masanori; Doi, Isao; and Takedomi, Yumiko, to Minolta Camera Kabushiki Kaisha. Photosensitive member having an overcoat layer and process for manufacturing the same. 4,886,724, Cl. 430-66.000.

Masamoto, Kazuhisa: *See*—
Yagihara, Hiroshi; Goto, Yukihisa; Masamoto, Kazuhisa; Morishima, Yasuo; and Osabe, Hirokazu, 4,886,546, Cl. 71-88.000.

Mashikian, Matthew S.; Northop, Robert B.; Bansal, Rajeev; and Nikias, Chrysostomos L., to University of Connecticut. Method and instrumentation for the detection, location and characterization of partial discharges and faults in electric power cables. 4,887,041, Cl. 324-533.000.

Mason, Billie M., to Wild West Artwear, Inc. Apparel with carriers for neck-wear. 4,885,805, Cl. 2-244.000.

Mason, Stanley I., Jr.; and Handler, Michael D., to Kimberly-Clark Corporation. Absorbent pad with reinforcing member to resist deformation. 4,886,513, Cl. 604-385.100.

Massachusetts Institute of Technology: *See*—
D'Amore, Patricia; Leong, Kam W.; and Langer, Robert S., 4,886,870, Cl. 528-206.000.
Pritchard, David E.; and Keith, David W., 4,886,964, Cl. 250-251.000.

Massen, Robert. Method and arrangement for measuring and/or monitoring properties of yarns or ropes. 4,887,155, Cl. 358-107.000.

Massengill, Richard K.: *See*—
Parisi, Tulio; and Massengill, Richard K., 4,886,491, Cl. 604-22.000.

Masuda, Katsuhiko: *See*—
Ikegami, Hiroshi; Muto, Tetsuji; Hamada, Tetsuro; Masuda, Katsuhiko; Shimada, Kazuhiko; and Shibuya, Kazunori, 4,886,141, Cl. 180-233.000.

Masuda, Shinichi: *See*—
Satow, Aritomo; Masuda, Shinichi; Sugimoto, Kazuyoshi; and Muta, Yuji, 4,886,434, Cl. 418-55.00D.

Masuda, Tomohiko: *See*—
Kitano, Hirohisa; Saito, Itaru; Shingaki, Kouichi; Matsubara, Ken; and Masuda, Tomohiko, 4,887,104, Cl. 350-355.000.

Masumoto, Tsuyoshi: *See*—
Jinno, Masafumi; Kake, Ichiro; Nishina, Yuichiro; and Masumoto, Tsuyoshi, 4,886,717, Cl. 430-19.000.

Masutani, Takayoshi: *See*—
Sugiyama, Masanori; Masutani, Takayoshi; and Shirai, Takao, 4,887,024, Cl. 324-61.00R.

Matake, Kozo, to Ebara Corporation. Thrust bearing device. 4,886,378, Cl. 384-308.000.

Matl, Helmut, to VDO Adolf Schindling AG. Indicating instrument. 4,886,227, Cl. 248-27.100.

Matsubara, Ken: *See*—
Kitano, Hirohisa; Saito, Itaru; Shingaki, Kouichi; Matsubara, Ken; and Masuda, Tomohiko, 4,887,104, Cl. 350-355.000.

Matsuda, Eiji: *See*—
Sato, Tomio; Matsuoka, Shigeru; Matsuda, Eiji; and Yonenaga, Hitoshi, 4,887,165, Cl. 358-474.000.

Matsuda, Yoshio; and Fujishima, Kazuyasu, to Mitsubishi Denki Kabushiki Kaisha. Semiconductor memory device and the method for manufacturing the same. 4,887,136, Cl. 357-23.600.

Matsuki, Hideo: *See*—
Yagi, Toru; and Matsuki, Hideo, 4,885,944, Cl. 73-862.360.

Matsumoto, Hiroshi: *See*—
Fujii, Setsuro; Yamashita, Jun-ichi; Matsumoto, Hiroshi; Takeda, Setsuo; Terada, Tadafumi; Yasumoto, Mitsugi; and Unemi, Norio, 4,886,877, Cl. 536-23.000.

Matsumoto, Jun-ichi; Miyamoto, Teruyuki; Egawa, Hiroshi; and Nakamura, Shinichi, to Dainippon Pharmaceutical Co., Ltd. Quinoline derivatives, pharmaceutical composition and method of use. 4,886,810, Cl. 514-312.000.

Matsumoto, Takahiro; Suenaga, Haruo; Maehara, Naoyoshi; Sakamoto, Kazuho; Niwa, Takashi; Bessyo, Daisuke; Kusunoki, Shigeru; and Shitaya, Takao, to Matsushita Electric Industrial Co., Ltd. Power supply for a magnetron having a rectifying circuit, switching circuit, and transformer. 4,886,951, Cl. 219-10.55B.

Matsumoto, Tetsuro, to Hitachi, Ltd. Semiconductor memory device. 4,887,237, Cl. 365-182.000.

Matsumura, Tomoya, to TDK Corporation. Transformer for a flyback type converter. 4,887,061, Cl. 336-178.000.

Matsumura, Yasushi; Shuhara, Akira; Sasaki, Shigeo; Fukumoto, Kazumi; and Takeya, Hitoshi, to Mitsubishi Denki Kabushiki Kaisha. Ion beam irradiating apparatus including ion neutralizer. 4,886,971, Cl. 250-492.200.

Matsunaga, Hideki; and Hirate, Naoyuki, to Kabushiki Kaisha Toshiba. Apparatus for introducing samples into an inductively coupled, plasma source mass spectrometer. 4,886,966, Cl. 250-288.000.

Matsuoka, Shigeru: *See*—
Sato, Tomio; Matsuoka, Shigeru; Matsuda, Eiji; and Yonenaga, Hitoshi, 4,887,165, Cl. 358-474.000.

Matsushita Electric Industrial Co., Ltd.: *See*—
Bannai, Tatsushi; Awamoto, Shigeru; Chiba, Mitsuo; and Sasaki, Seishi, 4,887,169, Cl. 358-335.000.
Matsumoto, Takahiro; Suenaga, Haruo; Maehara, Naoyoshi; Sakamoto, Kazuho; Niwa, Takashi; Bessyo, Daisuke; Kusunoki, Shigeru; and Shitaya, Takao, 4,886,951, Cl. 219-10.55B.
Miyakawa, Yasumi; and Ide, Tatsuki, 4,887,252, Cl. 358-48.000.
Sawai, Kiyoshi; Yamamoto, Shuuichi; Morokoshi, Hiroshi; Yamamura, Michio; and Muramatsu, Shigeru, 4,886,435, Cl. 418-55.000.
Takeda, Takeshi; Tsuchiya, Sohji; Watanabe, Yoshio; and Sekido, Satoshi, 4,887,186, Cl. 361-321.000.
Tanaka, Eiichiro; Takimoto, Akio; Akiyama, Koji; Onomichi, Kyoko; Watanabe, Masanori; and Sakahara, Chisato, 4,886,719, Cl. 430-58.000.
Torii, Hideo; Aoki, Masaki; Komoda, Hideaki; Aoki, Nobuyuki; Ota, Ikuo; and Ochiai, Keiichi, 4,886,714, Cl. 428-694.000.
Yamaguchi, Seiji, 4,887,084, Cl. 341-160.000.

Matsushita Electric Works, Ltd.: *See*—
Nakao, Kouichi; Toki, Akira; Morisue, Kazushige; and Kobayashi, Hiroyasu, 4,887,073, Cl. 340-693.000.

Matsushita, Kouji: *See*—
Yuge, Shizuo; Matsushita, Kouji; and Kawabata, Hidetoshi, 4,887,130, Cl. 355-251.000.

Matsuura, Ichiro: *See*—
Sugiura, Takashi; Matsuura, Ichiro; Miyauchi, Fumio; and Chiyoshi, Toyoharu, 4,886,630, Cl. 264-46.600.

Matsuura, Iwao, to Nissho Corporation. Urine-collecting device. 4,886,510, Cl. 604-353.000.

Matsuzaki, Atsushi; Kobayashi, Hiroyuki; Tomita, Hideo; Kikuchi, Kenichi; Inoue, Kenji; Kondo, Yoshiyuki; Hirayasu, Masatoshi; and Ichise, Atsushi, to Sony Corporation. Message delivery system operable in an override mode upon reception of a command signal. 4,887,152, Cl. 358-86.000.

Matsuzawa, Kunihiko: *See*—
Hirose, Yoshihiko; Aoki, Tomohiro; Chiku, Kazuyoshi; Murayama, Yasushi; Uchida, Takashi; and Matsuzawa, Kunihiko, 4,887,101, Cl. 346-134.000.

Matthews, Robert T.: *See*—
Davis, Cecil J.; Matthews, Robert T.; Loewenstein, Lee M.; Jucha, Rhett B.; Hildenbrand, Randall C.; and Jones, John I., 4,886,570, Cl. 156-643.000.

Mattison, Phillip L.; Wirth, Ronald P.; Virnig, Michael J.; and Krbechek, LeRoy, to Henkel Corporation. Process for recovery of an amino acid from aqueous mixtures thereof. 4,886,889, Cl. 548-497.000.

Mattison, Phillip L.: *See*—
Tuominen, Francis W.; Swanson, Ronald R.; Mattison, Phillip L.; MacKay, Kenneth D.; and Glorvigen, Bradley W., 4,886,888, Cl. 548-497.000.

Mattsson, Lars. Device for collecting and absorbing urine. 4,886,509, Cl. 604-349.000.

Mauchan, Donald E.; and Corrigan, Alfred E., to Polaroid Corporation. 35 mm self-developing transparency film assemblage. 4,886,732, Cl. 430-210.000.

Mavroudis, Eugene G.: *See*—
Goldberg, Ronald N.; Mavroudis, Eugene G.; and Ferguson, Susan H., 4,886,387, Cl. 401-122.000.

Maxwell, Ian E.; and Minderhoud, Johannes K., to Shell Oil Company. Process for the conversion of a hydrocarbonaceous feedstock. 4,886,934, Cl. 585-660.000.

Maynard, Brian K.; and Bassuk, Nina L., to Cornell Research Foundation, Inc. Banding techniques for plant propagation. 4,885,868, Cl. 47-58.000.

Mazda Motor Corporation: *See*—
Asoh, Seiiti, 4,886,312, Cl. 296-76.000.
Nakai, Eiji, 4,886,022, Cl. 123-90.170.

MCC Corporation: *See*—
Nishikawa, Hideichi, 4,885,963, Cl. 81-57.320.

McCabe, Stanley G., to Jensen Corporation. Spreader feeder apparatus. 4,885,853, Cl. 38-143.000.

McCafferty, Hugh A., to Boeing Company, The. Elastomeric bearing for helicopter rotor having lead-lag damping. 4,886,419, Cl. 416-134.00A.

McClain, Edward L.: *See*—
Werner, Walter N.; Biscardi, Jeffrey K.; and McClain, Edward L., 4,885,930, Cl. 73-37.000.

McCowin, Peter D.; and Nelson, Paul E., to Boeing Company, The. Vacuum bag tooling apparatus with inflatable seal. 4,886,442, Cl. 425-388.000.

McCracken, John A.; and Kelley, Barry L., to Minnesota Mining and Manufacturing Company. Aligned stretched surface recording medium. 4,887,178, Cl. 360-135.000.

McCullough, Francis P., Jr.; Cipriano, Robert A.; and Snelgrove, R. Vernon, to Dow Chemical Company, The. Molten membrane electrolyte battery. 4,886,715, Cl. 429-103.000.

McCutcheon, Samuel, to Autek Systems Corporation. Low phase jitter oscillator. 4,887,051, Cl. 331-69.000.

McGhie, Joseph A.: *See*—
Boden, Richard M.; and McGhie, Joseph A., 4,886,897, Cl. 558-252.000.

McGinnis, Leon W.: *See*—
Carroll, James R.; McGinnis, Leon W.; Miller, Terry L.; and Norris, Michael B., 4,886,699, Cl. 428-228.000.

McGrath, Michael S.: *See*—
Hood, Leroy E.; Weissman, Irving L.; and McGrath, Michael S., 4,886,743, Cl. 435-5.000.

McGraw, John F.: *See*—
Garner, Harrison A., Jr.; Hemphill, Raymond M.; McGraw, John F.; Schmidt, Michael L.; Smith, Bruce A.; and Wert, David E., 4,886,640, Cl. 420-111.000.

McKee, Jere L.: *See*—
Gula, Lance; and McKee, Jere L., 4,887,057, Cl. 335-190.000.

McKee, Thomas S.: *See*—
Betterton, Joseph T.; Glover, Alfred H.; McKee, Thomas S.; and Romanczuk, Chris S., 4,886,033, Cl. 123-574.000.

McKinlay, Peter R.: *See*—
Bennett, Peter G.; McKinlay, Peter R.; Shaw, Neil W.; and Stott, Ronald A., 4,886,563, Cl. 156-205.000.

McKittrick, Brian A.; and Katz, Alan H., to American Home Products Corporation. Substituted 1,3,4,9-tetrahydropyrano[3,4-b]indole-1-acetic acids. 4,886,886, Cl. 548-432.000.

McLellan, Edward J.: *See*—
Wolrich, Gilbert M.; McLellan, Edward J.; and Yodlowski, Robert A. J., 4,887,232, Cl. 364-754.000.

McManus, John R., to Carrier Corporation. Method of attaching an insulator block with a T-slot to a coil. 4,885,840, Cl. 29-611.000.

McMillan, Guy H.: *See*—
Turner, James J.; McMillan, Guy H.; Pintelon, Joseph A. E.; Waryu, Joseph C.; Kennon, James L.; and Muller, Peter E., 4,886,013, Cl. 118-668.000.

McNabb, John P., to Micron Technology, Inc. Vibrational method of aligning the leads of surface-mount electronic components with the mounting pads of printed circuit boards during the molten solder mounting process. 4,885,841, Cl. 29-834.000.

McNamara, George, to Sico Incorporated. Folding headboard for folding bed. 4,885,813, Cl. 5-136.000.

Mead Corporation, The: *See*—
Spamer, William S., 4,886,171, Cl. 211-59.200.

Medex, Inc.: *See*—
Patton, William E.; and Lindsey, William J., 4,886,507, Cl. 604-284.000.

Medical Concepts Development, Inc.: *See*—
Annett, Leland W., 4,886,165, Cl. 206-370.000.

MedInnovations, Inc.: *See*—
Fischell, Robert E.; and Fischell, Tim A., 4,886,061, Cl. 128-305.000.

Medtronic, Inc.: *See*—
Wiktor, Dominik M., 4,886,062, Cl. 128-343.000.

Meduri, Gianfranco U.: *See*—
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Morikawa, Takeshi, to Minolta Camera Kabushiki Kaisha. Copying machine. 4,887,122, Cl. 355-30.000.
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Morita, Tetsuya, to Ricoh Company, Ltd. Communication network having multi-conjunction architecture. 4,887,259, Cl. 370-60.000.
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Morrell, Albert M.: *See*—
D'Amato, Ralph J.; Godfrey, Richard H.; Morrell, Albert M.; and Ragland, Frank R., Jr., 4,887,001, Cl. 313-461.000.
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Votruba, Jan; and Morris, George R., 4,887,038, Cl. 324-318.000.
Morris, Gregory J. E., to Dow Chemical Company, The. Combination electrolysis cell seal member and membrane tentering means for a filter press type electrolytic cell. 4,886,586, Cl. 204-128.000.
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Deambrosio, Carlos; and Morris, James M., 4,886,201, Cl. 228-37.000.
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Gabrlik, Zdenek; Morris, John M.; and Green, Charles J., 4,886,089, Cl. 137-202.000.
Moss, C. William: *See*—
Lawrence, George W.; and Moss, C. William, 4,886,084, Cl. 135-103.000.
Mothersole, David S.: *See*—
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Motorola Inc.: *See*—
Boland, Bernard W.; Gandy, William E., Jr.; and Jackson, Kevin B, 4,886,762, Cl. 437-15.000.
Borth, David E.; and Kepler, James F., 4,887,050, Cl. 331-34.000.
Felix, Kenneth A., 4,887,265, Cl. 370-94.100.
Lill, Mark P.; Li, Edward E.; and Sun, Koushun, 4,886,029, Cl. 123-479.000.
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Mouret, Patrick, to Rivierre Casalis. Control of twine guide arm in a pickup baler. 4,885,990, Cl. 100-88.000.
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Moyal, Miki Z., to Advanced Micro Devices, Inc. Time continuous, differential analog-to-digital converter. 4,887,085, Cl. 341-169.000.
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MTU Motoren- und Turbinen-Union Muenchen GmbH: *See*—
Andrees, Gerhard; Kranzeder, Josef; and Vogel, Wilhelm, 4,886,639, Cl. 419-28.000.
Mu, Albert T., to Advanced Micro Devices, Inc. Pin grid array package structure. 4,887,148, Cl. 357-74.000.
Muchmore, Charles H. Portable pocket spittoon. 4,885,809, Cl. 4-259.000.
Mueller, Hans W., to Smith Corona Corporation. Tape cassette for metering correction tape feed. 4,886,383, Cl. 400-208.000.
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Jung, Gerard; and Mugnier, Jacques, 4,886,664, Cl. 424-93.000.
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Eichner, Ronald D.; and Mullbacher, Arno, 4,886,796, Cl. 514-211.000.
Muller, Erich R.; and Volkert, Edmund. Gearshifting device for a manually operated transmission for motor vehicles. 4,886,151, Cl. 192-3.620.
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Biederstedt, Lutz; and Muller, Manfred, 4,887,183, Cl. 361-124.000.
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Muller, Peter E.: *See*—
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Cirkel, Hans-Jurgen; Bette, Willi; and Muller, Reinhard, 4,887,275, Cl. 372-83.000.
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Montegari, David M.; and Muller, Ronald M., 4,887,289, Cl. 379-22.000.
Multilastic Limited: *See*—
Docker, Leslie T.; and Whittleworth, William, 4,886,249, Cl. 267-91.000.

Muraishi, Katsuaki: *See*—
Ohnishi, Masahiro; Ogura, Nobuhiko; and Muraishi, Katsuaki, 4,886,968, Cl. 250-327.200.
Murakami, Eiichi; Kohno, Michio; and Suzuki, Akiyoshi, to Canon Kabushiki Kaisha. Surface examining apparatus for detecting the presence of foreign particles on two or more surfaces. 4,886,975, Cl. 250-572.000.
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Muramatsu, Kenzo: *See*—
Shinoda, Naoharu; Yoneda, Kenichi; Hino, Masao; Muramatsu, Kenzo; Miyake, Masato; Shimizu, Taku; and Otani, Hidehiko, 4,886,524, Cl. 55-8.000.
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Murata Manufacturing Co., Ltd.: *See*—
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Murayama, Yasushi: *See*—
Hirose, Yoshihiko; Aoki, Tomohiro; Chiku, Kazuyoshi; Murayama, Yasushi; Uchida, Takashi; and Matsuzawa, Kunihiko, 4,887,101, Cl. 346-134.000.
Murdock, Susan L.: *See*—
Hubbell, Nelson M.; Murdock, Susan L.; and Romano, Ernest P., 4,886,163, Cl. 206-334.000.
Murphy, James R.: *See*—
Hodgens, Thomas A.; Lowrie, Amy L.; and Murphy, James R., 4,887,301, Cl. 382-9.000.
Murray, Charles N.; and Fortescue, Thomas R., to Europaische Atomgemeinschaft (EURATOM). Device for measuring the impedance of a medium along a measurement line. 4,887,040, Cl. 324-446.000.
Murray, John H.: *See*—
Kerr, Robert C.; and Murray, John H., 4,886,692, Cl. 428-82.000.
Muss, Peter: *See*—
Fink, Hans-Ferdi; Berger, Roland; Heilen, Wernfried; and Muss, Peter, 4,886,551, Cl. 106-183.000.
Musso, Charles S., Jr.; and Musso, Tom W., to Air-Flo Mfg. Co. Inc. Dump truck with integrated spreader system. 4,886,214, Cl. 239-676.000.
Musso, Tom W.: *See*—
Musso, Charles S., Jr.; and Musso, Tom W., 4,886,214, Cl. 239-676.000.
Muta, Yuji: *See*—
Satow, Aritomo; Masuda, Shinichi; Sugimoto, Kazuyoshi; and Muta, Yuji, 4,886,434, Cl. 418-55.00D.
Muto, Tetsuji: *See*—
Ikegami, Hiroshi; Muto, Tetsuji; Hamada, Tetsuro; Masuda, Katsuhiko; Shimada, Kazuhiko; and Shibuya, Kazunori, 4,886,141, Cl. 180-233.000.
Naber, Charles: *See*—
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Nadherny, Rudolph E.: *See*—
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Nagahashi, Shinichi: *See*—
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Katagiri, Junichi; Nagai, Akira; Tawara, Keiko; Takahashi, Akio; Wajima, Motoyo; Narahara, Toshikazu; and Hiraga, Ryo, 4,886,858, Cl. 525-301.000.
Nagano, Hirosaku; Kawai, Hideki; and Akahori, Kiyokazu, to Kanegafuchi Chemical Ind. Co., Ltd. Polyimide having excellent thermal dimensional stability. 4,886,874, Cl. 528-353.000.
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Imanaka, Asaji; and Nagata, Kazutaka, 4,886,320, Cl. 303-11.000.
Nahachewski, Vladimir W. Anti-tip device for a vehicle. 4,886,294, Cl. 280-755.000.
Nail, Richard: *See*—
Krenik, William R.; Hsu, Wei-chan; and Nail, Richard, 4,887,048, Cl. 330-258.000.
Naito, Hiromitsu: *See*—
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Naito, Minoru. Method for sorting paperboard blanks. 4,886,263, Cl. 271-176.000.
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Nakagawa, Hirotaka: *See*—
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Nakagawa, Katsumi: *See*—
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Gofuku, Ihachiro; Osada, Yoshiyuki; Nakagawa, Katsumi; Hatanaka, Katsunori; Saika, Toshihiro; and Kaifu, Noriyuki, 4,886,977, Cl. 250-578.000.
Nakai, Eiji, to Mazda Motor Corporation. Engine valve driving apparatus. 4,886,022, Cl. 123-90.170.
Nakai, Hatsuo, to Clover Co., Ltd. Combination lock. 4,885,923, Cl. 70-284.000.
Nakai, Hirotaka; and Edagawa, Setsuji, to O.K. Trading Co., Ltd. Far infrared ray emitting body of a core material coated with an ultrafine powder. 4,886,972, Cl. 250-504.00R.
Nakai, Satoru; and Kamei, Mitsuru, to Power Reactor and Nuclear Fuel Development Corporation. Heat pipe type heat exchanger. 4,886,111, Cl. 165-70.000.
Nakajima, Masahiro: *See*—
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Nakamoto, Kouji: *See*—
Yamagishi, Youji; Akasaka, Kozo; Suzuki, Takeshi; Miyamoto, Mitsuaki; Nakamoto, Kouji; Okano, Kazuo; Abe, Shinya; Ikuta, Hironori; Hayashi, Kenji; Yoshimura, Hiroyuki; Fujimori, Tohru; Harada, Koukichi; and Yamatsu, Isao, 4,886,834, Cl. 514-521.000.
Nakamura, Ikushi; Ootsuka, Hiroshi; Fukushima, Akira; Kudo, Yoshinobu; Hata, Yoshiaki; Inoue, Manabu; and Inoue, Norihiro, to Minolta Camera Kabushiki Kaisha. Camera. 4,887,107, Cl. 354-195.120.
Nakamura, Koki; Sakanoue, Kei; and Ichijima, Seiji, to Fuji Photo Film Co., Ltd. Silver halide color photographic material. 4,886,736, Cl. 430-359.000.
Nakamura, Masahiko: *See*—
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Nakamura, Shinichi: *See*—
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Nakamura, Shizuo; Inoue, Makoto; Inai, Masatoshi; and Tsuda, Yoshiaki, to Otsuka Pharmaceutical Factory, Inc. Proline derivatives. 4,886,813, Cl. 514-326.000.
Nakamura, Tadashi; Fujita, Satoshi; and Ishida, Eiichi, to Kubota, Ltd. Engine cooling structure for agricultural tractor. 4,886,135, Cl. 180-68.100.
Nakamura, Takao: *See*—
Kitagaki, Kanshiro; Ebihara, Keiko; Morioka, Shigeo; Nakamura, Takao; and Okada, Taizo, 4,886,667, Cl. 424-195.100.
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Nakamura, Tohru: *See*—
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Nakamura, Yasuhide; and Yamamura, Sigeyuki, to Sharp Kabushiki Kaisha. Department level setting in an electronic cash register. 4,887,210, Cl. 364-405.000.
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Iihoshi, Akira; Nakamura, Yukinobu; and Yasui, Shinichiro, 4,887,081, Cl. 340-995.000.
Nakane, Kazunori: *See*—
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Nakanishi, Hisao: *See*—
Yamane, Hisakazu; Ishida, Ritsuo; Nakanishi, Hisao; Yanai, Keiji; Toshiyasu, Masayuki; Ikegami, Kazunori; Okuda, Soichiro; Kimura, Kenji; Ishibata, Koji; and Ishii, Yoshinori, 4,886,999, Cl. 313-414.000.
Nakanishi Metal Works Co., Ltd.: *See*—
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Nakano, Hajime: *See*—
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Nakano, Hiroyuki: *See*—
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Nakao, Kouichi; Toki, Akira; Morisue, Kazushige; and Kobayashi, Hiroyasu, to Matsushita Electric Works, Ltd. Ceiling mounted fire detector assembly. 4,887,073, Cl. 340-693.000.
Nakaoka, Yuji, to NEC Corporation. Prohibition circuit upon power-on event. 4,886,984, Cl. 307-272.300.
Nakatani, Tadashi: *See*—
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Nakatsu, Keiji; Kamitsu, Katsuaki; and Ogawa, Masaharu, to Mitsubishi Denki Kabushiki Kaisha. Optical disk drive device for positioning a carriage to a retract position. 4,887,254, Cl. 369-33.000.
Nakayama, Kazuaki, to Pioneer Electronic Corporation. Sum/differential signal processing circuit. 4,887,045, Cl. 330-69.000.

Nakayashiki, Susumu; Kashio, Jiro; and Harakawa, Takeshi, to Hitachi, Ltd. Data communication network system and reconfiguration control method. 4,887,256, Cl. 370-16.000.

Nakazato, Kazuo: *See—*
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Nakejima, Hiroshi: *See—*
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Nakhamkin, Michael, to Gibbs & Hill, Inc. Compressed air turbomachinery cycle with reheat and high pressure air preheating in recuperator. 4,885,912, Cl. 60-652.000.

Nalco Chemical Company: *See—*
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Nalewajek, David, to Allied-Signal Inc. Synthesis of carbon fluoride and carbon fluoride chloride. 4,886,921, Cl. 570-170.000.

Narahara, Toshikazu: *See—*
Katagiri, Junichi; Nagai, Akira; Tawara, Keiko; Takahashi, Akio; Wajima, Motoyo; Narahara, Toshikazu; and Hiraga, Ryo, 4,886,858, Cl. 525-301.000.

Natarajan, Bharath, to International Business Machines Corporation. Automated system for estimating impact on inventory cost due to an engineering change to a component. 4,887,206, Cl. 364-401.000.

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National Research Development Corporation: *See—*
Smith, John A. S., 4,887,034, Cl. 324-307.000.

National Semiconductor Corporation: *See—*
Garverick, Timothy L.; Yazdy, Farid A.; Henderson, Richard D.; and Meier, Webster B., 4,887,240, Cl. 361-222.000.

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Nave, Jerald L., to E Z Breathe, Inc. Assisted breathing interface device. 4,886,057, Cl. 128-203.110.

Neal, Charles O., to DeRoyal Industries, Inc. Stay for orthopedic appliance for the knee. 4,886,053, Cl. 128-80.00C.

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Aoki, Yasuhiro, 4,886,334, Cl. 350-96.150.
Hashimoto, Kiyokazu, 4,887,242, Cl. 365-238.500.
Inoue, Taketoshi, 4,887,044, Cl. 329-300.000.
Nakaoka, Yuji, 4,886,984, Cl. 307-272.300.
Ohki, Junichi, 4,887,156, Cl. 358-133.000.
Oota, Takashi; and Uchikawa, Tadao, 4,886,382, Cl. 400-124.000.
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Nedorezov, Vladimir A.: *See—*
Azamatov, Ramil A.; Zamitter, Mikhail N.; Zema, Evgeny M.; Nedorezov, Vladimir A.; and Oblovatsky, Anatoly K., 4,886,292, Cl. 280-718.000.

Nee, John D.; and Green, Richard A., to Westinghouse Electric Corp. Replacement of split-pin assemblies in nuclear reactor. 4,885,961, Cl. 81-55.000.

Nefedov, Pavel S.: *See—*
Puzrin, Leonid G.; Atroshenko, Miron G.; Yaremenko, Vladimir L.; Ischenko, Jury Y.; Nefedov, Pavel S.; Pescherin, Ivan G.; Serebryanik, Ilya P.; and Polev, Evgeny I., 4,886,203, Cl. 228-126.000.

Nelle, Ulrich: *See—*
Flohrs, Peter; Heyke, Klaus; Michel, Hartmut; and Nelle, Ulrich, 4,886,985, Cl. 307-315.000.

Nelson, James T.: *See—*
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Nelson, Paul E.: *See—*
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Nelson Research & Development Co.: *See—*
Minaskanian, Gevork; and Peck, James V., 4,886,783, Cl. 574-29.000.
Peck, James V.; and Minaskanian, Gevork, 4,886,545, Cl. 71-88.000.

Nemeth, Istvan; Simon, Bela; and Nemeth, Istvan, to Gepjarmu Javito Kisszovetkezet. Method and apparatus for adjusting the wheels and axles of motor vehicles. 4,885,846, Cl. 33-203.130.

Nemeth, Istvan: *See—*
Nemeth, Istvan; Simon, Bela; and Nemeth, Istvan, 4,885,846, Cl. 33-203.130.

Nemkov, Valentin V.: *See—*
Ismagilov, Zinfer R; Zamaraev, Kirill I.; Khairulin, Sergei R.; Alkhazov, Tofik G.; Ismagilov, Foat R.; Ivanov, Alexei A.; Barannik, Georgy B.; Kerzhentsev, Mikhail A.; Nemkov, Valentin V.; and Parmon, Valentin N., 4,886,649, Cl. 423-230.000.

Neogi, Amar N.: *See—*
Perdelwitz, Lee E., Jr; Young, Robert H.; Iff, Ron H.; Hanke, David E.; Allison, Kathleen S.; Rahkonen, Raimo K.; and Neogi, Amar N., 4,886,697, Cl. 428-192.000.

Neri, Carlo; Nodari, Nereo; and Sandre, Giovanni, to Enichem Sintesi S.p.A. Tetrakis(3-(3,5-di-tert.buyl-4-hydroxyphenyl)propionyloxymethyl) methane with amorphous structure, process for its preparation and its use as a stabilizer. 4,886,900, Cl. 560-75.000.

Nestec S.A.: *See—*
Akesson, Yngve, 4,886,676, Cl. 426-289.000.

Neuman, Grover H.: *See—*
Johnson, Donavon W.; Neuman, Grover H.; Sauer, Charles H.; Shaheen-Gouda, Amal A.; and Smith, Todd A., 4,887,204, Cl. 364-200.000.

Neupauer, Elfriede, heir: *See—*
Neupauer, Helmut, deceased, 4,887,200, Cl. 363-81.000.

Neupauer, Helmut, deceased (by Neupauer, Elfriede, heir), to Siemens Aktiengesellschaft. Method and apparatus for determining the actual value of the margin-angle in the valves of an inverter. 4,887,200, Cl. 363-81.000.

Neuzil, Richard W.; and Antos, George J., to UOP Inc. Separation of para-xylene. 4,886,929, Cl. 585-828.000.

Neve, Brian D.; Lawrence, Peter J.; and Owen, Lyndon N., to Process Automation & Computer Systems Ltd. Communication system. 4,887,266, Cl. 370-95.100.

New Cosmos Electric Co. Ltd.: *See—*
Kasahara, Riichiro; and Takada, Tadashi, 4,885,929, Cl. 73-23.000.

New York Telephone Company: *See—*
Montegari, David M.; and Muller, Ronald M., 4,887,289, Cl. 379-22.000.

Newell Operating Co.: *See—*
Randall, Harold M., 4,886,236, Cl. 248-250.000.

Newton, Walter A., to Entravision, Inc. Mechanism for coupling the aspirant line of an irrigation/aspiration machine to the pressure monitoring section. 4,886,498, Cl. 604-118.000.

NGK Insulators, Ltd.: *See—*
Mizuno, Takeyuki; and Kato, Koji, 4,886,695, Cl. 428-137.000.

Ngo, That T., to Bioprobe International, Inc. Preparation of polymeric thiol gels for covalent bonding of biologically active ligands. 4,886,755, Cl. 435-183.000.

NHK Spring Co., Ltd.: *See—*
Nishiyama, Masakazu; Shinbori, Takeyoshi; and Yamamoto, Hideo, 4,886,256, Cl. 267-221.000.

Niagara Mohawk Power Corporation: *See—*
Fernandes, Roosevelt A.; and Sieron, Richard L., 4,886,980, Cl. 307-64.000.

Nichols, Gary H.: *See—*
Haynie, Carl R.; Gipson, Kirk P.; and Nichols, Gary H., 4,887,011, Cl. 315-403.000.

Nickola, Anne D. Plural utility supply pedestal including contained common grounding means. 4,887,187, Cl. 361-369.000.

Nicolet Instrument Corporation: *See—*
Cummins, Kenneth L.; Hecox, Kurt E.; and Williamson, Malcolm J., 4,887,299, Cl. 381-68.400.

Niedospial, John J., Jr.; Robertson, Jeffrey C.; and Fraser, Mark D., to Eastman Kodak Company. Film cassette. 4,887,112, Cl. 354-275.000.

Niedospial, John J., Jr., to Eastman Kodak Company. Film cassette and method of assembling the same. 4,887,113, Cl. 354-275.000.

Nielsen, Christian M.; and Bolton, James C., to Industrial Tools, Inc. Tape slitter adjustment means. 4,885,964, Cl. 83-56.000.

Nielsen, Claus J.: *See—*
Raagaard, Jacob; and Nielsen, Claus J., 4,886,337, Cl. 350-96.200.

Nies, David L.; and Shroyer, Tomas L., to General Motors Corporation. Low hysteresis proportioner valve. 4,886,319, Cl. 303-9.750.

Niewohner, Ulrich; Hoever, Franz-Peter; Lieb, Folker; Rosentreter, Ulrich; Perzborn, Elisabeth; Fiedler, Volker-Bernd; and Seuter, Friedel, to Bayer Aktiengesellschaft. Intermediates for circulation-active substituted aminomethyl-5,6,7,8-tetrahydronaphthyloxy-acetic acids. 4,886,898, Cl. 560-42.000.

Nihon Cement Co., Ltd.: *See—*
Sakashita, Kimiaki; Kouno, Masaaki; and Tsukazaki, Hideo, 4,886,533, Cl. 55-498.000.

Niikura, Kanako: *See—*
Murakami, Yoshikazu; Mizunuma, Yasuyuki; Ohgihara, Takahiro; Nakano, Hiroyuki; Niikura, Kanako; and Okamoto, Tsutomu, 4,887,052, Cl. 331-96.000.

Niino, Hiroaki: *See—*
Aoike, Tatsuyuki; Sano, Masafumi; Yoshino, Takehito; Kariya, Toshimitsu; and Niino, Hiroaki, 4,886,723, Cl. 430-65.000.

Niki, Kenichi; Kokogawa, Tohru; Ishizu, Akira; and Takasago, Hayato, to Mitsubishi Denki Kabushiki Kaisha. Testing device for electrical circuit boards. 4,887,030, Cl. 324-158.00P.

Nikias, Chrysostomos L.: *See—*
Mashikian, Matthew S.; Northop, Robert B.; Bansal, Rajeev; and Nikias, Chrysostomos L., 4,887,041, Cl. 324-533.000.

Nikkon Chemicals Company, Limited: *See—*
Kondou, Tsutomu, 4,886,677, Cl. 426-548.000.

Nilssen, Ole K. Self-oscillating inverter with adjustable frequency. 4,887,201, Cl. 363-132.000.

Ninagawa, Yoichi: *See—*
Tanaka, Yasuyuki; Ibata, Koichi; Mizuno, Masao; Ninagawa, Yoichi; and Nishida, Takashi, 4,886,904, Cl. 560-249.000.

Nippon Air Brake Co., Ltd.: *See—*
Imanaka, Asaji; and Nagata, Kazutaka, 4,886,320, Cl. 303-11.000.

Nippon Kokan Kabushiki Kaisha: *See—*
Mizukami, Hideaki; Mori, Kentaro; Ozeki, Akichika; Kawawa, Takaho; Sugitani, Yuji; Nomura, Hirokazu; Fujioka, Tadashi; and Nakagawa, Hirotaka, 4,886,547, Cl. 75-0.50C.

Nippon Seiko Kabushiki Kaisha: *See—*
Kozuka, Hajime; Saito, Naoki; Morishita, Mitsuharu; and Kohge, Shinichi, 4,886,136, Cl. 180-79.100.
Osawa, Nobuyuki, 4,886,374, Cl. 384-13.000.
Osawa, Nobuyuki, 4,886,376, Cl. 384-15.000.
Tsukada, Toru, 4,886,375, Cl. 384-15.000.

Nippon Soken, Inc.: *See*—
Iwanami, Shigeki; Inagaki, Mitsuo; Sasaya, Hideaki; Tanaka, Taro; and Kojima, Akikazu, 4,886,423, Cl. 417-222.000.

Nippon Steel Corporation: *See*—
Higaki, Yuzo; Goto, Hiroyuki; and Tanikawa, Keiichi, 4,886,612, Cl. 252-49.500.
Shindo, Takuji; Naito, Hiromitsu; Kondo, Masayoshi; Fukuyama, Takashi; Koizumi, Masaaki; and Fukada, Nobuo, 4,886,559, Cl. 148-421.000.

Nippon Zoki Pharmaceutical Co., Ltd.: *See*—
Kitamura, Norihiko; and Ohnishi, Akimoto, 4,886,807, Cl. 514-258.000.

Nippondenso Co., Ltd.: *See*—
Kajino, Sadayosi; and Iida, Atsuomi, 4,887,056, Cl. 335-126.000.
Shibata, Yoshihisa; and Mizuno, Hiroshi, 4,887,089, Cl. 343-700.0MS.

Niro, Masaichi: *See*—
Ikeda, Kunihiko; Suzuki, Shigeru; Yokota, Takashi; Shimura, Akira; Kodama, Yutaka; Yamazaki, Shigeru; Niro, Masaichi; and Tomita, Satoru, 4,887,133, Cl. 355-321.000.

Nishi, Seiki: *See*—
Watanabe, Mikio; Shimanuki, Koji; and Nishi, Seiki, 4,887,161, Cl. 358-224.000.

Nishida, Shinichi: *See*—
Uchinami, Masanobu; Takahashi, Toshihisa; Suzuki, Hiroyoshi; Nishiyama, Ryoji; and Nishida, Shinichi, 4,886,028, Cl. 123-479.000.

Nishida, Takashi: *See*—
Tanaka, Yasuyuki; Ibata, Koichi; Mizuno, Masao; Ninagawa, Yoichi; and Nishida, Takashi, 4,886,904, Cl. 560-249.000.

Nishikawa, Hideichi, to MCC Corporation. Oscillating drive apparatus for working tool and working apparatus using the same. 4,885,963, Cl. 81-57.320.

Nishimatsu, Shigeru: *See*—
Suzuki, Keizo; Hiraoka, Susumu; and Nishimatsu, Shigeru, 4,886,571, Cl. 156-646.000.

Nishina, Yuichiro: *See*—
Jinno, Masafumi; Kake, Ichiro; Nishina, Yuichiro; and Masumoto, Tsuyoshi, 4,886,717, Cl. 430-19.000.

Nishiyama, Hidemi; and Ohtani, Kenichi, to Furukawa Electric Co., Ltd., The. Flame retardant thermoplastic polyurethane resin composition. 4,886,848, Cl. 524-109.000.

Nishiyama, Masakazu; Shinbori, Takeyoshi; and Yamamoto, Hideo, to NHK Spring Co., Ltd. Vehicle suspension device with a coil spring embedded in an open cell foam. 4,886,256, Cl. 267-221.000.

Nishiyama, Ryoji: *See*—
Uchinami, Masanobu; Takahashi, Toshihisa; Suzuki, Hiroyoshi; Nishiyama, Ryoji; and Nishida, Shinichi, 4,886,028, Cl. 123-479.000.

Nishiyama, Yutaka: *See*—
Kimura, Etsuji; Hasegawa, Nozomu; and Nishiyama, Yutaka, 4,886,777, Cl. 505-1.000.

Nisi, Dieter; and Paul, Helmut, to Daimler-Benz Aktiengesellschaft. Process for curing sand moldings. 4,886,105, Cl. 164-16.000.

Nissan Motor Co., Ltd.: *See*—
Maeda, Ryoji, 4,886,314, Cl. 296-192.000.
Okamoto, Mitsuyuki, 4,886,291, Cl. 280-707.000.

Nisshin Flour Milling Co., Ltd.: *See*—
Sueda, Noriyoshi; Suzuki, Yoshikuni; Sugai, Toshiji; Yamada, Hiroaki; and Yanai, Makoto, 4,886,803, Cl. 514-252.000.

Nisshin Oil Mills, Ltd., The: *See*—
Higaki, Yuzo; Goto, Hiroyuki; and Tanikawa, Keiichi, 4,886,612, Cl. 252-49.500.

Nissho Corporation: *See*—
Matsuura, Iwao, 4,886,510, Cl. 604-353.000.

Nitschke, David B., to Glasstech International L.P. Blow back control device for a glass sheet tempering system. 4,886,540, Cl. 65-351.000.

Nittan Company, Limited: *See*—
Kimura, Tetsuo; and Kobayashi, Akihiro, 4,887,072, Cl. 340-691.000.

Niwa, Takashi: *See*—
Matsumoto, Takahiro; Suenaga, Haruo; Maehara, Naoyoshi; Sakamoto, Kazuho; Niwa, Takashi; Bessyo, Daisuke; Kusunoki, Shigeru; and Shitaya, Takao, 4,886,951, Cl. 219-10.55B.

Nixdorf Computer AG: *See*—
Ruecker, Christoph; and Thorwesten, Wolfgang, 4,885,838, Cl. 29-566.300.

NKK Corporation: *See*—
Koshihara, Toshio; Misawa, Rokurou; Sagawa, Yuzo; and Takehara, Kimio, 4,886,370, Cl. 374-5.000.
Teramoto, Toyokazu; Fujibayashi, Akio; Fukuda, Kozo; Ueda, Mashiro; Nagahashi, Shinichi; Kataoka, Yazuru; Sato, Hiroaki; Wada, Tsunemi; Gino, Takao; Saito, Yoshio; and Morioka, Kiyotaka, 4,886,558, Cl. 148-146.000.

Noack, Dieter: *See*—
Christopher, Hans-Gunther; Thurk, Joachim; Noack, Dieter; and Schultz, Thomas, 4,886,944, Cl. 200-48.00R.

Nobel Chematur AB: *See*—
Thorsson, Conny, 4,886,751, Cl. 435-162.000.

Nodari, Nereo: *See*—
Neri, Carlo; Nodari, Nereo; and Sandre, Giovanni, 4,886,900, Cl. 560-75.000.

Noe, Andreas: *See*—
Noe, Oskar; Noe, Rolf; Noe, Andreas; Dotsch, Willi; and Lux, Herbert, 4,886,199, Cl. 226-118.000.

Noe, Oskar; Noe, Rolf; Noe, Andreas; Dotsch, Willi; and Lux, Herbert, to Bergwerk-und Walzwerk-Maschinenbau GmbH. Strip drive for advancing materials for processing. 4,886,199, Cl. 226-118.000.

Noe, Rolf: *See*—
Noe, Oskar; Noe, Rolf; Noe, Andreas; Dotsch, Willi; and Lux, Herbert, 4,886,199, Cl. 226-118.000.

Noell, J. Oakey: *See*—
Albarella, James P.; Noell, J. Oakey; Vogelhut, Paul O.; and Ward, deceased, Frederick E., 4,886,625, Cl. 252-500.000.

Noguchi, Masahiko: *See*—
Sasage, Tsutomu; and Noguchi, Masahiko, 4,886,596, Cl. 209-539.000.

Noguchi, Teruhisa: *See*—
Umegai, Shigehiro; Noguchi, Teruhisa; Morita, Hirobumi; Uehara, Takashi; and Hoshino, Takayuki, 4,885,833, Cl. 29-407.000.

Noguchi, Yasuhiro; Yamada, Hitoshi; and Funyu, Yukio, to Hitachi, Ltd.; and Hitachi Process Computer Engineering, Inc. Cursor display apparatus. 4,887,230, Cl. 364-560.000.

Noguchi, Yukio: *See*—
Fujita, Yoshihiro; Komatsuzaki, Hiroshi; Shoji, Masao; Noguchi, Yukio; Hirai, Masayoshi; and Ohno, Kazunori, 4,887,109, Cl. 354-222.000.

Nomura, Hirokazu: *See*—
Mizukami, Hideaki; Mori, Kentaro; Ozeki, Akichika; Kawawa, Takaho; Sugitani, Yuji; Nomura, Hirokazu; Fujioka, Tadashi; and Nakagawa, Hirotaka, 4,886,547, Cl. 75-0.50C.

Nordica S.p.A.: *See*—
Sartor, Mariano; and Gonella, Mario, 4,885,850, Cl. 36-119.000.

Nordmann, Adolf, to Rheinmetall GmbH. Magazine chain for ammunition. 4,885,976, Cl. 89-35.010.

Nordson Corporation: *See*—
Ruud, Jan, 4,886,215, Cl. 239-690.100.
Turner, James J.; McMillan, Guy H.; Pintelon, Joseph A. E.; Waryu, Joseph C.; Kennon, James L.; and Muller, Peter E., 4,886,013, Cl. 118-668.000.

Norris, Michael B.: *See*—
Carroll, James R.; McGinnis, Leon W.; Miller, Terry L.; and Norris, Michael B., 4,886,699, Cl. 428-228.000.

North Carolina State University: *See*—
Sederoff, Ronald R.; Stomp, Anne-Marie; Moore, Larry W.; and Chilton, Scott W., 4,886,937, Cl. 800-1.000.

Northop, Robert B.: *See*—
Mashikian, Matthew S.; Northop, Robert B.; Bansal, Rajeev; and Nikias, Chrysostomos L., 4,887,041, Cl. 324-533.000.

Norton, Kenneth A.: *See*—
Heffernan, Mary B.; Norton, Kenneth A.; and Cowger, Bruce, 4,885,932, Cl. 73-53.000.

Novak, Emmerich: *See*—
Anderle, Friedrich; Costescu, Dan L.; Kempf, Stefan; Novak, Emmerich; and Zejda, Jaroslav, 4,886,592, Cl. 204-298.000.

Novak, Ronald W.; and Emmons, William D., to Rohm and Haas Company. Aldehyde or imine oxygen scavengers for vinyl polymerizations. 4,886,618, Cl. 252-188.280.

Novation Design Ltd.: *See*—
Ziegler, James T., 4,886,477, Cl. 446-104.000.

Novo Industri A/S: *See*—
de Baynast de Septfontaines, Regis J. M. P.; Brouard, Francois E. M. E.; Baret, Jean-Luc A. G.; Gicquiaux, Yvon G. A. J. M.; and Olsen, Hans S., 4,886,672, Cl. 426-48.000.

Noyori, Ryoji; Suzuki, Masaaki; Yanagisawa, Akira; and Kurozumi, Seizi, to Teijin Limited. Process for production of prostaglandins D2. 4,886,903, Cl. 560-121.000.

Nukem GmbH: *See*—
Hackstein, Karl-Gerhard; and Hezel, Rudolf, 4,886,555, Cl. 136-255.000.

Numa, Nobushige, to Kansai Paint Company, Limited. Process for preparing an aqueous dispersion. 4,886,852, Cl. 524-458.000.

Numasaki, Yoso; Takahashi, Koichiro; and Ohata, Isao, to Yamanouchi Pharmaceutical Co., Ltd. Inhibiting growth of tumors with certain substituted phenoxy dimethyl acids, esters or salts. 4,886,818, Cl. 514-345.000.

Numata, Shunichi: *See*—
Hayashida, Shigeru; Tai, Seiji; Hayashi, Nobuyuki; Iwakabe, Yasushi; Kinjo, Noriyuki; and Numata, Shunichi, 4,886,721, Cl. 430-59.000.
Watanabe, Hiroshi; Miura, Osamu; Miyazaki, Kunio; Numata, Shunichi; and Otsuka, Kanji, 4,886,573, Cl. 156-643.000.

Nuova Italsider S.p.A.: *See*—
Azzerri, Nazzareno; and Giorgi, Leonardo, 4,886,712, Cl. 428-632.000.

Nute, Ernest B., Jr.: *See*—
Hemphill, John M.; and Nute, Ernest B., Jr., 4,885,889, Cl. 52-484.000.

Nytomt, Jan G.: *See*—
Johansson, Sven H.; and Nytomt, Jan G., 4,886,036, Cl. 123-596.000.

O/A Technologies Inc.: *See*—
Kaneko, Tamaki, 4,887,060, Cl. 355-323.000.

O.K. Trading Co., Ltd.: *See*—
Nakai, Hirotaka; and Edagawa, Setsuji, 4,886,972, Cl. 250-504.00R.

Oba, Hidehiro; and Kato, Senji, to Toyota Jidosha Kabushiki Kaisha. Method of and system for controlling fuel injection rate in an internal combustion engine. 4,886,030, Cl. 123-488.000.

Oba, Ryozo. Dot printing device capable of printing underline together with characters. 4,887,226, Cl. 364-519.000.

Obauashi, Akira: *See*—
Kawamura, Masahide; Sakakibara, Masaki; Watanabe, Teruo; Obauashi, Akira; Hiraoka, Nobutsugu; and Kita, Keiko, 4,886,756, Cl. 435-199.000.

Obayashi, Hisashi; Tanabayashi, Chikara; Asaka, Akiyoshi; and Gotou, Yukio, to Takeda Chemical Industries, Ltd. Agricultural composition with reduced toxicity to fishes and shellfishes. 4,886,656, Cl. 424-10.000.

Oberg Industries, Inc.: *See*—
Walters, Harry, 4,886,973, Cl. 250-548.000.

Oblovatsky, Anatoly K.: *See*—
Azamatov, Ramil A.; Zamitter, Mikhail N.; Zema, Evgeny M.; Nedorezov, Vladimir A.; and Oblovatsky, Anatoly K., 4,886,292, Cl. 280-718.000.

OCE-Nederland B.V.: *See*—
Derks, Paul A. H., 4,887,093, Cl. 346-75.000.
Robert, Rob W., 4,887,228, Cl. 364-521.000.

Ochiai, Keiichi: *See*—
Torii, Hideo; Aoki, Masaki; Komoda, Hideaki; Aoki, Nobuyuki; Ota, Ikuo; and Ochiai, Keiichi, 4,886,714, Cl. 428-694.000.

Ochiai, Takashi: *See*—
Takeda, Mikio; Inage, Masaru; Wada, Hiroshi; Tamaki, Hajime; and Ochiai, Takashi, 4,886,817, Cl. 514-341.000.

Ochiai, Toshihiro: *See*—
Yanagawa, Hisaharu; Ochiai, Toshihiro; Miyazawa, Hidenisa; Yamaguchi, Shizuka; Fumeno, Tsuyoshi; Raijo, Hiroshi; and Ohmizu, Seiji, 4,886,335, Cl. 350-96.200.

Ochs, Gordon M. Modular flotation support collar assembly for aquaculture fish pen. 4,886,015, Cl. 119-3.000.

O'Connell, Peter: *See*—
Bellas, Benjamin J.; and O'Connell, Peter, 4,886,949, Cl. 219-10.55A.

Oda, Hidekazu: *See*—
Yoneda, Masahiro; Hatanaka, Masahiro; Kohno, Yoshio; Satoh, Shinichi; Oda, Hidekazu; and Moriizumi, Koichi, 4,887,137, Cl. 357-23.600.

Odenheimer, Ronald P., to Tektronix, Inc. Timing measurement for jitter display. 4,887,279, Cl. 375-10.000.

O'Donnell, Matthew, to General Electric Company. Method of, and apparatus for, obtaining a plurality of different return energy imaging beams responsive to a single excitation event. 4,886,069, Cl. 128-661.010.

Ogawa, Hidenori: *See*—
Tamada, Shigeharu; Fujioka, Takafumi; Ogawa, Hidenori; Teramoto, Shuji; and Kondo, Kazumi, 4,886,809, Cl. 514-312.000.

Ogawa, Masaharu: *See*—
Nakatsu, Keiji; Kamitsu, Katsuaki; and Ogawa, Masaharu, 4,887,254, Cl. 369-33.000.

Ogawa, Masaki; Shiomura, Yasuro; and Takizawa, Toshiki, to Bridgestone Corporation. Rubber compositions and pneumatic tires using the same. 4,886,850, Cl. 524-413.000.

Ogawa, Masao; and Sasaki, Toshio, to Brother Kogyo Kabushiki Kaisha. Needle thread tension control including separate stopping and adjustable pre-tension devices. 4,886,004, Cl. 112-254.000.

Ogura, Nobuhiko: *See*—
Ohnishi, Masahiro; Ogura, Nobuhiko; and Muraishi, Katsuaki, 4,886,968, Cl. 250-327.200.

Ohashi, Ryota: *See*—
Yamaoka, Kojiro; Azuma, Toshiro; Yano, Kazuhiko; and Ohashi, Ryota, 4,886,142, Cl. 180-242.000.

Ohata, Isao: *See*—
Numasaki, Yoso; Takahashi, Koichiro; and Ohata, Isao, 4,886,818, Cl. 514-345.000.

Ohga, Akihito; and Itani, Akira, to Mitsui Petrochemical Industries, Ltd. Process for producing barium titanates. 4,886,654, Cl. 423-598.000.

Ohgihara, Takahiro: *See*—
Murakami, Yoshikazu; Mizunuma, Yasuyuki; Ohgihara, Takahiro; Nakano, Hiroyuki; Niikura, Kanako; and Okamoto, Tsutomu, 4,887,052, Cl. 331-96.000.

Ohi Seisakusho Co., Ltd.: *See*—
Shimura, Ryoji, 4,886,309, Cl. 292-336.300.

Ohki, Junichi, to NEC Corporation. Method and system for transform coding of video signals. 4,887,156, Cl. 358-133.000.

Ohkita, Yasuo: *See*—
Kamada, Keiichi; Torikai, Motoyuki; and Ohkita, Yasuo, 4,886,704, Cl. 428-323.000.

Ohlhausen, Otto: *See*—
Konzmann, Rainer; Ohlhausen, Otto; Schmitt, Joachim; Koucky, Antonin; and Klink, Josef, 4,886,317, Cl. 297-417.000.

Ohlschlager: *See*—
Berthold, Werner; Marx, Paul; and Ohlschlager, 4,886,737, Cl. 430-372.000.

Ohmizu, Seiji: *See*—
Yanagawa, Hisaharu; Ochiai, Toshihiro; Miyazawa, Hidenisa; Yamaguchi, Shizuka; Fumeno, Tsuyoshi; Raijo, Hiroshi; and Ohmizu, Seiji, 4,886,335, Cl. 350-96.200.

Ohmori, Naoto, to Minolta Camera Kabushiki Kaisha. Laser beam scanning apparatus with compact SOS sensor. 4,886,963, Cl. 250-235.000.

Ohnari, Mikihiko; Sekozawa, Teruji; Funabashi, Motohisa; Atago, Takeshi; and Shioya, Makoto, to Hitachi, Ltd. Method of engine control timed to engine revolution. 4,887,216, Cl. 364-431.060.

Ohnemuller, Hans-Joachim: *See*—
Leiber, Heinz; Ohnemuller, Hans-Joachim; and Kastner, Klaus, 4,886,140, Cl. 180-197.000.

Ohnishi, Akimoto: *See*—
Kitamura, Norihiko; and Ohnishi, Akimoto, 4,886,807, Cl. 514-258.000.

Ohnishi, Masahiro; Ogura, Nobuhiko; and Muraishi, Katsuaki, to Fuji Photo Film Co., Ltd. Radiation image read-out apparatus. 4,886,968, Cl. 250-327.200.

Ohno, Kazunori: *See*—
Fujita, Yoshihiro; Komatsuzaki, Hiroshi; Shoji, Masao; Noguchi, Yukio; Hirai, Masayoshi; and Ohno, Kazunori, 4,887,109, Cl. 354-222.000.

Ohno, Kouji: *See*—
Miyazawa, Kazutoshi; Inukai, Takashi; Inoue, Hiromichi; Saito, Shinichi; and Ohno, Kouji, 4,886,622, Cl. 252-299.610.

Ohno, Makoto: *See*—
Suzuki, Mitsuru; Ohno, Makoto; and Yamamoto, Isamu, 4,886,631, Cl. 264-48.000.

Ohnuma, Yoshiyuki: *See*—
Goto, Yasuhiro; Yonezawa, Takeyuki; and Ohnuma, Yoshiyuki, 4,886,767, Cl. 501-97.000.

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Kimura, Okitoshi; Kabata, Toshiyuki; and Ohsawa, Toshiyuki, 4,886,572, Cl. 156-633.000.

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Suzuki, Shigeru; Ohshiro, Katsuhiko; and Kasugai, Ichiro, 4,886,436, Cl. 418-100.000.

Ohta, Tomio: *See*—
Shibuya, Kimiyuki; Takahashi, Yoshio; Sato, Seiichi; Shigyo, Hiromichi; Ohta, Tomio; and Uchida, Yasumi, 4,886,822, Cl. 514-357.000.

Ohtaka, Yoshimitsu, to Tokyo Electric Co., Ltd. Process of producing a valve element. 4,885,830, Cl. 29-157.00C.

Ohtani, Kenichi: *See*—
Nishiyama, Hidemi; and Ohtani, Kenichi, 4,886,848, Cl. 524-109.000.

Ohtsuki, Osamu: *See*—
Tsujihara, Kenji; Arai, Yoshihisa; Ohtsuki, Osamu; and Nakatani, Tadashi, 4,886,894, Cl. 556-40.000.

Oike, Ikuo: *See*—
Uehara, Kenji; Takayanagi, Shinji; and Oike, Ikuo, 4,886,149, Cl. 188-306.000.

Oishi, Kengo, to Fuji Photo Film Co., Ltd. Magnetic tape cassette. 4,886,220, Cl. 242-188.000.

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Komatsubara, Kiichi; Tanuma, Seiichi; Okabe, Katsuya; and Katsuyama, Toshio, 4,887,273, Cl. 372-41.000.

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Kitagaki, Kanshiro; Ebihara, Keiko; Morioka, Shigeo; Nakamura, Takao; and Okada, Taizo, 4,886,667, Cl. 424-195.100.

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Okano, Hiroshi: *See*—
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Yamagishi, Youji; Akasaka, Kozo; Suzuki, Takeshi; Miyamoto, Mitsuaki; Nakamoto, Kouji; Okano, Kazuo; Abe, Shinya; Ikuta, Hironori; Hayashi, Kenji; Yoshimura, Hiroyuki; Fujimori, Tohru; Harada, Koukichi; and Yamatsu, Isao, 4,886,834, Cl. 514-521.000.

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Mitsuhashi, Shigeru; Kondo, Hitoshi; Okazaki, Tetsuharu; Endoh, Shinji; Kudo, Hiroko; Yamaguchi, Akio; Tsuruta, Haruki; and Akutagawa, Susumu, 4,886,623, Cl. 252-299.650.

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Kakinuma, Hiroaki; Kasuya, Yukio; Sakamoto, Masaaki; Watanabe, Tsukasa; and Mouri, Mikio, 4,887,166, Cl. 358-471.000.
Suzuki, Ken-ichi, 4,886,763, Cl. 437-61.000.

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Hasumi, Kazuo; Watanabe, Hideomi; Okita, Tsutomu; Ryoke, Katsumi; and Kosha, Hideaki, 4,886,703, Cl. 428-323.000.

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Okuda, Masahiro: *See*—
Handa, Yuichi; Okuda, Masahiro; and Osawa, Hiroshi, 4,887,255, Cl. 369-112.000.
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Yamane, Hisakazu; Ishida, Ritsuo; Nakanishi, Hisao; Yanai, Keiji; Toshiyasu, Masayuki; Ikegami, Kazunori; Okuda, Soichiro; Kimura, Kenji; Ishibata, Koji; and Ishii, Yoshinori, 4,886,999, Cl. 313-414.000.
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Utsunomiya, Shin; Okumura, Mitsuhiro; and Morita, Takeshi, 4,886,108, Cl. 164-461.000.
Okumura, Mitsunao, to Murata Manufacturing Co., Ltd. Through type capacitor. 4,887,185, Cl. 361-302.000.
Olgren, Leland N., to General Motors Corporation. Electrical connector assembly for a steering wheel occupant cushion restraint system. 4,886,460, Cl. 439-15.000.
Olin corporation: *See*—
Gasper, Kenneth E.; and Vella, Philip A., 4,886,653, Cl. 423-478.000.
Olin Hunt Specialty Products Inc.: *See*—
Salamy, Thomas E.; Love, Marvin L., Jr.; and Towner, Mark E., 4,886,728, Cl. 430-331.000.
Oliver, James T.: *See*—
Grozinger, Karl G.; and Oliver, James T., 4,886,801, Cl. 514-247.000.
Olofsson, Bjorn. Pump arrangement, particularly for pumping water from deep wells. 4,886,428, Cl. 417-389.000.
Olsen, Hans S.: *See*—
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Holzhauer, Juergen K.; Oltrogge, Robert D.; and Michalak, Dennis J., 4,886,901, Cl. 560-77.000.
Olympus Optical Co., Ltd.: *See*—
Uehara, Masao; Sasaki, Masahiko; Kanno, Masahide; Hasegawa, Jun; Yamashita, Shinji; and Sasagawa, Katsuyoshi, 4,887,153, Cl. 358-98.000.
Omar, Inc.: *See*—
Lawrence, George W.; and Moss, C. William, 4,886,084, Cl. 135-103.000.
Omura, Satoshi; Nakagawa, Akira; and Iwai, Yuzuru, to Kitazato Institute, The. Derivatives from cervinomycin based antibiotics. 4,886,884, Cl. 546-36.000.
Onishi, Takashi; Suzuki, Shigeaki; Mori, Toshiki; Fujii, Hiroshi; and Fujita, Yoshiji, to Kuraray Company, Ltd. Process for preparing sulfone compounds. 4,886,916, Cl. 568-34.000.
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Ono, Tetsuo: *See*—
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Tanaka, Eiichiro; Takimoto, Akio; Akiyama, Koji; Onomichi, Kyoko; Watanabe, Masanori; and Sakahara, Chisato, 4,886,719, Cl. 430-58.000.
Ooka, Masataka: *See*—
Kuwamura, Shinichi; and Ooka, Masataka, 4,886,862, Cl. 526-247.000.
Oono, Masahiro, to Asahi Kogaku Kogyo Kabushiki Kaisha. Appratus for measuring the profile of an aspherical surface. 4,886,362, Cl. 356-346.000.
Oota, Takashi; and Uchikawa, Tadao, to NEC Corporation. Printing hammer comprising two hinge parts coupling an arm to a base member on both sides of a hinge coupling the arm to a piezoelectric actuator. 4,886,382, Cl. 400-124.000.
Ootsuka, Hiroshi: *See*—
Ishimura, Toshihiko; Tsuji, Kenji; Taniguchi, Nobuyuki; and Ootsuka, Hiroshi, 4,887,119, Cl. 354-413.000.
Nakamura, Ikushi; Ootsuka, Hiroshi; Fukushima, Akira; Kudo, Yoshinobu; Hata, Yoshiaki; Inoue, Manabu; and Inoue, Norihiro, 4,887,107, Cl. 354-195.120.
Opti-Copy, Incorporated: *See*—
Wally, Joseph H., Jr.; Pace, Herbert W.; and Halsey, Ronald L., 4,887,123, Cl. 355-30.000.
Orbital Engine Company Proprietary Limited: *See*—
Seeber, Kenneth P.; and Schlunke, Christopher K., 4,886,021, Cl. 123-73.0PP.
O'Reilly, John: *See*—
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Orrell, William B.; and Creps, Wendell D., to General Motors Corporation. Fuel injection temperature compensation system. 4,886,027, Cl. 123-478.000.
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Wegner, Gerhard; and Orthmann, Ernst, 4,886,685, Cl. 427-430.100.
O'Ryan Industries: *See*—
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Yagihara, Hiroshi; Goto, Yukihisa; Masamoto, Kazuhisa; Morishima, Yasuo; and Osabe, Hirokazu, 4,886,546, Cl. 71-88.000.
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Osada, Yoshiyuki: *See*—
Gofuku, Ihachiro; Osada, Yoshiyuki; and Nakagawa, Katsumi, 4,886,962, Cl. 250-211.00J.
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Osaka Gas Co., Ltd.: *See*—
Krishnan, Gopala; Gusman, Michael; Johnson, Sylvia M.; Rowcliffe, David J.; and Nakano, Hajime, 4,886,652, Cl. 423-439.000.
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Osawa, Izumi: *See*—
Masaki, Kenji; Osawa, Izumi; Fujiwara, Masanori; Doi, Isao; and Takedomi, Yumiko, 4,886,724, Cl. 430-66.000.
Osawa, Nobuyuki, to Nippon Seiko Kabushiki Kaisha. Linear guide apparatus. 4,886,374, Cl. 384-13.000.
Osawa, Nobuyuki, to Nippon Seiko Kabushiki Kaisha. Dust-proof seal for linear guide apparatus. 4,886,376, Cl. 384-15.000.
Osgood, George M. Method of assembling line marker into suspended power line. 4,885,835, Cl. 29-463.000.
Ostendorf, Philip J. Musical wind instrument. 4,885,971, Cl. 84-387.000.
Ostermann, Friedrich; Dumont, Christian; Balbach, Rainer; and Sollner, Gerhard, to Vereingte Aluminum-Werke Aktiengesellschaft. Deep drawable aluminum sheet or strip. 4,886,713, Cl. 428-687.000.
Osthoff, Hermann: *See*—
Horbach, Rainer; and Osthoff, Hermann, 4,886,285, Cl. 280-43.140.
Ostlinning, Edgar: *See*—
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Ota, Ikuo: *See*—
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Ota, Masanori; Akutsu, Fumio; and Takahashi, Kazuo, to Kureha Kagaku Kogyo K. K. Styrene based resin composition. 4,886,857, Cl. 525-74.000.
Otani, Hidehiko: *See*—
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Otis Engineering Corporation: *See*—
Perkins, Donald H.; Deaton, Thomas M.; and Sizer, Phillip S., 4,886,114, Cl. 166-65.100.
Ross, Colby M.; Giusti, Frank, Jr.; and Hendrickson, James D., 4,886,113, Cl. 166-51.000.
Oto, Ikuo; Hyakutake, Hayato; and Kobirumaki, Ryo, to Iwatsu Electric Co., Ltd. Liquid developer for electrostatic photography. 4,886,730, Cl. 430-137.000.
Otsuka Kagaku Kabushiki Kaisha: *See*—
Torii, Shigeru; Taniguchi, Masatoshi; Sasaoka, Michio; Tomotaki, Yoshihisa; Akada, Mitsuo; Tanaka, Hideo; Suzuki, Akira; and Yamashita, Shiro, 4,886,891, Cl. 549-434.000.
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Otsuka Pharmaceutical Co., Ltd.: *See*—
Tamada, Shigeharu; Fujioka, Takafumi; Ogawa, Hidenori; Teramoto, Shuji; and Kondo, Kazumi, 4,886,809, Cl. 514-312.000.
Otsuka Pharmaceutical Factory, Inc.: *See*—
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Ozawa, Yoshio; and Shigaki, Takao, to Fuji Photo Film Co., Ltd. Device for conveying photographic paper for use in photograph printing apparatus. 4,886,352, Cl. 355-28.000.
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Pace, Herbert W.: *See*—
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Packaging Industries Group, Inc.: *See*—
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Paffhausen, Hans; Hogarth, Ian; Scott, Andrew; and Mackintosh, Christine, to Caribonum Ltd. Ink ribbon having elastomeric protective backing. 4,886,386, Cl. 400-241.400.
Pagendarm Beschichtungstechnik GmbH: *See*—
Pagendarm, Ralph; and Hebels, Albert, 4,886,564, Cl. 156-230.000.

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Paisley, Gary V.: *See—*
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Palermo, Thomas J., to C. R. Bard, Inc. Steerable guidewire with soft adjustable tip. 4,886,067, Cl. 128-657.000.

Pall Corporation: *See—*
Gsell, Thomas C.; Salinaro, Richard F.; and Degen, Peter J., 4,886,836, Cl. 521-53.000.

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Pappanikolaou, Sofia. Chainbar. 4,885,907, Cl. 59-78.000.

Papst-Motoren GmbH: *See—*
Engelberger, Raimund; Harmsen, Siegfried; Kirchgessner, Hilmar; and Schneider, Josef, 4,886,415, Cl. 415-119.000.

Paradis, Roland C., to Perkin-Elmer Corporation, The. Detector cell for liquid chromatography. 4,886,356, Cl. 356-246.000.

Parisi, Tulio; and Massengill, Richard K. Liposuction procedure with ultrasonic probe. 4,886,491, Cl. 604-22.000.

Park, Young Go. Portable practicing putting green. 4,886,274, Cl. 273-176.0FB.

Parker, Thornton J., III. Traction device adapted to compensate for tire size variations resulting from inflation and road deflection. 4,886,100, Cl. 152-219.000.

Parker, William P. Screen printable luminous panel display device. 4,887,003, Cl. 313-634.000.

Parkinson Cowan Ltd.: *See—*
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Parmley, Charles L.: *See—*
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Parmon, Valentin N.: *See—*
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Parsons, Charles F., to Borg-Warner Chemicals, Inc. Polymer blends of polycarbonate styrene terpolymer and ABS resin. 4,886,855, Cl. 525-67.000.

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Patel, Amrit; Schebece, Frank; and Greenland, Harry, to Colgate-Palmolive Company. Shine hair conditioner. 4,886,660, Cl. 424-70.000.

Patel, Arvind: *See—*
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Patel, Dinesh R., to Schlumberger Technology Corporation. Inflatable well packers. 4,886,117, Cl. 166-187.000.

Patel, Jitendra A.: *See—*
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Patel, Nitin M.; and Wang, Shoou-I, to Air Products and Chemicals, Inc. Process for co-production of higher alcohols, methanol and ammonia. 4,886,651, Cl. 423-359.000.

Paton, Anthony D.: *See—*
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Paton, H. Neil. Suspension strut with selectively controllable differential rebound and jounce damping. 4,886,255, Cl. 267-205.000.

Patrick, E. Vincent, to United States of America, Army. Method of making wide angle and graded acuity intensifier tubes. 4,886,537, Cl. 65-4.300.

Patti, Giuseppe: *See—*
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Patton, William E.; and Lindsey, William J., to Medex, Inc. Y connector for angioplasty procedure. 4,886,507, Cl. 604-284.000.

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Pawlak, Andrzej M.; Graber, David W.; and Zuraski, Jeffery A., to General Motors Corporation. Electromagnetic control apparatus for varying the driver steering effort of a hydraulic power steering system. 4,886,137, Cl. 180-142.000.

Pawlak, Andrzej M.: *See—*
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Pearman, Arthur N. J., to Honeywell Inc. Coefficient of performance deviation meter for vapor compression type refrigeration systems. 4,885,914, Cl. 62-129.000.

Pearson, Norman R.: *See—*
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Pekruhn, Wolfgang; Kaiser, Ralf; and Kirchhoff, Hartmut, to Siemens Aktiengesellschaft. Thermal printing method. 4,887,092, Cl. 346-1.100.

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Penkunas, Joseph J.; Smith, Theodore E.; and Burwick, Jack L., to GTE Products Corporation. Method for producing metal carbide grade powders. 4,886,638, Cl. 419-15.000.

Penner, Jacob, to Inland Steel & Forgings Ltd. Big bale unroller. 4,886,409, Cl. 414-24.600.

Pennock, Betty D. Attachment for a safty belt harness. 4,886,318, Cl. 297-482.000.

Percarpio, Edward P.; and Plucinski, Andrzej J., to Becton, Dickinson and Company. Multiple sample needle assembly with vein indicator. 4,886,072, Cl. 128-763.000.

Perdelwitz, Lee E., Jr; Young, Robert H.; Iff, Ron H.; Hanke, David E.; Allison, Kathleen S.; Rahkonen, Raimo K.; and Neogi, Amar N., to Weyerhaeuser Company. Thermoplastic material containing absorbent pad or other article. 4,886,697, Cl. 428-192.000.

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Perkins, Donald H.; Deaton, Thomas M.; and Sizer, Phillip S., to Otis Engineering Corporation. Electric surface controlled subsurface valve system. 4,886,114, Cl. 166-65.100.

Perlman, Michael E.: *See—*
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Perrone, Ettore; Alpegiani, Marco; Bedeschi, Angelo; Zarini, Franco; Della Bruna, Costantino; and Franceschi, Giovanni, to Farmitalia Carlo Erba, S.r.l. Penem derivatives. 4,886,793, Cl. 514-192.000.

Perry, Robert. No reduction using sublimation of cyanuric acid. 4,886,650, Cl. 423-235.000.

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Peyre, Jacques, to Societe anonyme dite: SMH Alcatel. Machine for franking labels. 4,886,566, Cl. 156-361.000.

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Phillips, Gareth T.: *See—*
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Pidgeon, John T. Method of constructing a foundation for buildings. 4,886,399, Cl. 405-229.000.
Pielartzik, Harald; Dhein, Rolf; Meyer, Rolf-Volker; Traenckner, Hans-Joachim; and Ostlinning, Edgar, to Bayer Aktiengesellschaft. Thermotropic aromatic polyester carbonates, a process for their preparation and their use. 4,886,869, Cl. 528-196.000.
Pieperhoff, Hans J.; and Droge, Karl-Heinz, to Zoller-Kipper GmbH. Protective means for a lifting/tilting or tilting device. 4,886,411, Cl. 414-408.000.
Pifferi, Giorgio: *See*—
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Pinson, George T., to Boeing Company, The. Method of manufacturing reinforced optical fiber. 4,886,562, Cl. 156-172.000.
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Turner, James J.; McMillan, Guy H.; Pintelon, Joseph A. E.; Waryu, Joseph C.; Kennon, James L.; and Muller, Peter E., 4,886,013, Cl. 118-668.000.
Pinto, Akiva; Lucassen, Guenter; and Schmidt, Reinhard, to Hergeth Hollingsworth GmbH. Apparatus for protecting persons entering the zone of danger of power-operated textile machines. 4,887,070, Cl. 340-561.000.
Pioneer Electronic Corporation: *See*—
Nakayama, Kazuaki, 4,887,045, Cl. 330-69.000.
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Dannatt, Hugh S., 4,886,132, Cl. 177-4.000.
Tolmie, Robert J., Jr., 4,886,976, Cl. 250-578.000.
Place, Steven C.; and Hoffman, Arnold S. Strap for automotive body working. 4,885,925, Cl. 72-292.000.
Plantier, Jean-Louis. Vault structure for protection of roadways against snow. 4,885,879, Cl. 52-63.000.
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Plessey Overseas Limited: *See*—
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Poirier, Victor L.; Dasse, Kurt A.; Bowen, Mark A.; and Daly, Benedict D. T., to Thermedics, Inc. Peritoneal access catheter. 4,886,502, Cl. 604-175.000.
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Arnost, Michael J.; Inbar, Shai; Meneghini, Frank A.; Palumbo, Paul S.; Stroud, Stephen G.; and Zepp, Charles M., 4,886,744, Cl. 435-6.000.
Gaewsky, John P., 4,887,118, Cl. 354-413.000.
Mahapatra, Amaresh, 4,886,538, Cl. 65-30.130.
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Pourchon, Andre; and Guinamard, Dominique, to Societe Industrielle de Prefabrication Electrique. Device making it possible to lower the rear of a road vehicle to bring it to ground level. 4,886,290, Cl. 280-704.000.
Power Reactor and Nuclear Fuel Development Corporation: *See*—
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PPG Industries, Inc.: *See*—
Gerutti, Richard L.; Haskins, David R.; Heithoff, Robert B.; Schwenninger, Ronald L.; and Welton, Wright M., 4,886,539, Cl. 65-135.000.
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Pritchard, Jeffrey A., to Eastman Kodak Company. Method and apparatus for exposure control based on color balance information. 4,887,121, Cl. 354-430.000.
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Puckett, Lawrence J. Frame spar for soft airfoils. 4,886,008, Cl. 114-102.000.
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Raagaard, Jacob; and Nielsen, Claus J., to DantecElectronik, Medicinsk OG Videnskabeligt Måleudstyr A/S. Manipulator device for the transfer of laser light into an optical fiber. 4,886,337, Cl. 350-96.200.
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Records, Robert A.; Luchterhand, Ralph E.; and Detroit, John F., to U.S. Natural Resources, Log Boss Systems Division. Log conveyor system. 4,886,156, Cl. 198-692.000.
Reddy, S. Raghuma, to General Motor Corporation. Evaporative emission control system. 4,886,096, Cl. 141-45.000.
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Reilly, Hugh M. Accurate lightweight manual lawn and garden weed chipper. 4,886,125, Cl. 172-371.000.
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Reisenfeld, Sam, to Hughes Aircraft Company. System for detecting the presence of a signal of a particular data rate. 4,887,280, Cl. 375-121.000.
Reist, Walter, to Ferag AG. Method and apparatus for receiving folded printed products from printing machines or the like. 4,886,260, Cl. 270-60.000.
Remsburg, Ralph, to Preece Incorporated. Quick disconnect with a position compensating seal. 4,886,301, Cl. 285-39.000.
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Winfried, Arnold; Hesse, Horst; and Schumacher, Werner, 4,886,123, Cl. 172-7.000.
Robert Krups Stiftung & Co. KG: *See*—
Horn, Jurgen; and Kitzing, Walter, 4,886,133, Cl. 177-211.000.
Robert, Rob W., to Oce-Nederland B.V. Method for filling surface parts of an image with a surface pattern. 4,887,228, Cl. 364-521.000.
Roberts, Gerald B.; and West, Edward L., to A. B. Chance Company. Replaceable bushing and contact assembly for blade type air insulated switchgear. 4,886,945, Cl. 200-144.00R.
Robertson, Brian W.: *See*—
Bertola, Mauro A.; Marx, Arthur F.; Koger, Hein S.; Quax, Wilhelmus J.; Van der Laken, Cornelis J.; Phillips, Gareth T.; Robertson, Brian W.; and Watts, Peter D., 4,886,750, Cl. 435-136.000.
Robertson, Jeffrey C.: *See*—
Niedospial, John J., Jr.; Robertson, Jeffrey C.; and Fraser, Mark D., 4,887,112, Cl. 354-275.000.
Robinson, Phillip J.: *See*—
Jones, Winton D.; Claxton, George P.; Dage, Richard C.; Cheng, Hsien C.; and Robinson, Phillip J., 4,886,811, Cl. 514-314.000.
Robitschko, Peter; Claar, Klaus; Deischl, Hans; and Schumacher, Josef, to Daimler-Benz AG. Control system for a combined central locking and burglar alarm system for vehicles. 4,887,065, Cl. 340-430.000.
Robot Foto und Electronic GmbH U. Co. KG: *See*—
Gross, Mario, 4,887,080, Cl. 340-937.000.
Rock-Ola Mfg. Corporation: *See*—
Rockola, Donald C.; and Hague, Shuja, 4,886,325, Cl. 312-138.100.
Rockola, Donald C.; and Hague, Shuja, to Rock-Ola Mfg. Corporation. Display assembly for automatic can vending machine. 4,886,325, Cl. 312-138.100.
Rodgers, Colin, to Sundstrand Corporation. Method of operating a multipurpose auxiliary power unit. 4,885,909, Cl. 60-39.020.
Rodier, Jean-Claude: *See*—
Sabban, Joseph C.; Rodier, Jean-Claude; Roussel, Andre ; and Simon, Jacques F., 4,886,351, Cl. 351-221.000.
Roemer, Helmuth. Ram boring implement having a movable bit. 4,886,128, Cl. 175-19.000.
Roemer, Peter B.; Edelstein, William A.; Hayes, Cecil E.; and Eash, Matthew G., to General Electric Company. Method for providing multiple coaxial cable connections to a radio-frequency antenna without baluns. 4,887,039, Cl. 324-322.000.
Roempp, Claus, to Siemens Aktiengesellschaft. Method and arrangement for transmitting a digital signal with a low bit rate in a time section, provided for higher bit rates, of a time division multiplexed signal. 4,887,261, Cl. 370-84.000.
Roettger, William J., to General Signal Corporation. Spring return cylinder actuator. 4,885,981, Cl. 92-59.000.
Rogers Corporation: *See*—
Carroll, James R.; McGinnis, Leon W.; Miller, Terry L.; and Norris, Michael B., 4,886,699, Cl. 428-228.000.
Roggero, Arnaldo; Scrosati, Bruno; Andrei, Maria; Passerini, Stefano; and Pedretti, Ugo, to Eniricerche S.p.A. Solid polymeric electrolyte and electrochemical generators containing it. 4,886,716, Cl. 429-192.000.
Rohm GMBH Chemische Fabrik: *See*—
Eich, Manfred; and Wendorff, Joachim, 4,886,718, Cl. 430-20.000.
Rohm and Haas Company: *See*—
Clemens, David H.; Hurwitz, Marvin J.; and Walker, Robert W., 4,886,606, Cl. 210-684.000.
Novak, Ronald W.; and Emmons, William D., 4,886,618, Cl. 252-188.280.
Rohweder, Theodore R.; and Ray, Richard J., Jr., to Manville Corporation. Method of making an insulated window. 4,886,561, Cl. 156-102.000.
Rolscreen Company: *See*—
Baier, Bruce A., 4,886,103, Cl. 160-178.100.
Romagnoli, Andrea, to Cestind - Centro Studi Industriali - S.r.l. Apparatus for collating dual-use filter sachets arranged in the non-consumer mode in machines for the continuous production of said filter sachets. 4,885,896, Cl. 53-116.000.
Roman, Robert J. Mechanical analog computer device. 4,886,458, Cl. 434-243.000.
Romanczuk, Chris S.: *See*—
Betterton, Joseph T.; Glover, Alfred H.; McKee, Thomas S.; and Romanczuk, Chris S., 4,886,033, Cl. 123-574.000.
Romano, Ernest P.: *See*—
Hubbell, Nelson M.; Murdock, Susan L.; and Romano, Ernest P., 4,886,163, Cl. 206-334.000.
Romano', Luigi, to SGS Microelectronica S.p.A. Semiconductor device mounted in a highly flexible, segmented package, provided with heat sink. 4,887,149, Cl. 357-81.000.
Romanow, Richard: *See*—
Stein, Israel M.; Goodman, Alan S.; and Romanow, Richard, 4,886,164, Cl. 206-366.000.
Rook, Cornelis; and Klein, Willem, to Gebroeders Rock Beheer B.V. Method for manufacturing stones in a press. 4,886,633, Cl. 264-219.000.
Roos, Scott L.: *See*—
Brown, Tobias A.; Roos, Scott L.; Biancalana, Donald D.; and Westgaard, Donald J., 4,887,196, Cl. 362-148.000.
Roque, Benjamin: *See*—
Simon, Michael; and Roque, Benjamin, 4,887,074, Cl. 340-782.000.
Rork, Gerald S.: *See*—
Haslam, John L.; and Rork, Gerald S., 4,886,668, Cl. 424-424.000.
Rorke, Thomas P.: *See*—
Sypek, Maria T.; and Rorke, Thomas P., 4,886,731, Cl. 430-156.000.
Rose, James B., to E-Systems, Inc. Slant record/helical scan playback certifier. 4,887,171, Cl. 360-31.000.
Rose, Peter W.: *See*—
Rough, J. Kirkwood H.; and Rose, Peter W., 4,887,005, Cl. 315-111.210.
Rosenberger, Bruce R.: *See*—
Harton, Lynn M.; Rosenberger, Bruce R.; Anderson, John D.; and Walker, Clarence W., 4,886,468, Cl. 439-212.000.
Rosenthal, Stephen L.: *See*—
Irby, George P., III; and Rosenthal, Stephen L., 4,887,077, Cl. 340-825.470.
Rosentreter, Ulrich: *See*—
Niewohner, Ulrich; Hoever, Franz-Peter; Lieb, Folker; Rosentreter, Ulrich; Perzborn, Elisabeth; Fiedler, Volker-Bernd; and Seuter, Friedel, 4,886,898, Cl. 560-42.000.
Ross, Colby M.; Giusti, Frank, Jr.; and Hendrickson, James D., to Otis Engineering Corporation. Positive indication shear ring. 4,886,113, Cl. 166-51.000.
Ross, Stanley E., to Ross Systems Corporation. Methods for forming dental prosthesis. 4,886,456, Cl. 433-173.000.
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Ross, Stanley E., 4,886,456, Cl. 433-173.000.
Rosso, Charles. Nonsettling insulation structure. 4,885,886, Cl. 52-404.000.
Roth, Hans-Klaus: *See*—
Gruber, Harald; Richter, Andreas M.; Fanghanel, Egon; Roth, Hans-Klaus; Friedrich, Heinz; and Maras, Siegfried, 4,886,627, Cl. 252-513.000.
Rottmar, Werner; and Schmidt, Klaus, to Endress u. Hauser GmbH u. Co. Arrangement for leading a cable into a housing. 4,886,938, Cl. 174-52.100.
Rough, J. Kirkwood H.; and Rose, Peter W. Multiple electrode plasma reactor power distribution system. 4,887,005, Cl. 315-111.210.
Roussel, Andre : *See*—
Sabban, Joseph C.; Rodier, Jean-Claude; Roussel, Andre ; and Simon, Jacques F., 4,886,351, Cl. 351-221.000.
Roussel, Gerard: *See*—
Malleron, Jean-Luc; Ponsinet, Gerard; and Roussel, Gerard, 4,886,835, Cl. 514-532.000.
Roussel Uclaf: *See*—
Aktogu, Nurgun; and Clemence, Francois, 4,886,802, Cl. 514-250.000.
Rovema Verpackungsmaschinen GmbH: *See*—
Lohr, Herbert; Stein, Bernd; Becker, Helmut; Ade, Reiner; and Baur, Walter, 4,885,900, Cl. 53-551.000.
Rowcliffe, David J.: *See*—
Krishnan, Gopala; Gusman, Michael; Johnson, Sylvia M.; Rowcliffe, David J.; and Nakano, Hajime, 4,886,652, Cl. 423-439.000.
Roztocil, Tomas: *See*—
Jamali, Jamal; and Roztocil, Tomas, 4,887,128, Cl. 355-202.000.
Rubloff, Gary W.: *See*—
Clabes, Joachim G.; Hahn, Peter O.; Ho, Paul S.; Lefakis, Haralambos; and Rubloff, Gary W., 4,886,681, Cl. 427-38.000.
Ruckert, Edvard, to Ewald Witte & Co. Lock, particularly for trunk or engine compartments of automotive vehicles, doors or the like. 4,886,307, Cl. 292-216.000.
Rudolf, Jeschar: *See*—
Schurmann, Peter; Rudolf, Jeschar; and Volker, Frisch, 4,886,448, Cl. 432-99.000.

Ruecker, Christoph; and Thorwesten, Wolfgang, to Nixdorf Computer AG. Apparatus for connecting the free conductor ends of a conductor bundle. 4,885,838, Cl. 29-566.300.

Ruess, Wilhelm; Urech, Pierre; Eberle, Jurg; and Staub, Theodor, to Ciba-Geigy Corporation. Compositions for controlling plant diseases and the use thereof in plant protection. 4,886,824, Cl. 514-383.000.

Ruess, Wilhelm; Urech, Pierre; Eberle, Jurg; and Staub, Theodor, to Ciba-Geigy Corporation. Compositions for controlling plant diseases and the use thereof in plant protection. 4,886,825, Cl. 514-383.000.

Ruey-Guang, Wu, to Industrial Technology Research Institute. Telephone automatic redial system. 4,887,294, Cl. 379-355.000.

Rufin, Denis: *See*—
Hirase, Ikuo; and Rufin, Denis, 4,886,444, Cl. 431-5.000.

Ruhrgas Aktiengesellschaft: *See*—
Heuss, Helmut, 4,886,450, Cl. 432-235.000.

Ruimi, Michel M.: *See*—
Martinou, Robert L.; and Ruimi, Michel M., 4,886,583, Cl. 204-16.000.
Martinou, Robert L.; and Ruimi, Michel M., 4,886,585, Cl. 204-23.000.

Rumbaugh, James T., to Berkley, Inc. Graphite fiber reinforced rod construction. 4,885,865, Cl. 43-18.500.

Rupprecht, Eckhard: *See*—
Reiffen, Manfred; Hurnaus, Rudolf; Sauter, Robert; Grell, Wolfgang; and Rupprecht, Eckhard, 4,886,814, Cl. 514-326.000.

Rush, Hughey A.; Hibbard, Billy B.; Pursoo, Johnson L.; Lindsay, John W.; Smith, Thomas E.; Harper, Kenneth; Tullos, MIchael V.; and Davis, James E., to BASF Corporation. Fibrous polyacrylonitrile reinforcing mixture for friction product applications, and method of making same. 4,886,706, Cl. 428-288.000.

Rushlow, Leo M. J.: *See*—
Gilbert, Leslie C.; and Rushlow, Leo M. J., 4,886,076, Cl. 131-256.000.

Ruud, Jan, to Nordson Corporation. Hand operated powder spray pistol. 4,886,215, Cl. 239-690.100.

Ryokai, Kimitoshi; and Wakabayashi, Naruki, to Shimizu Construction Co., Ltd. Method and apparatus for measuring water content. 4,886,088, Cl. 137-78.300.

Ryoke, Katsumi: *See*—
Hasumi, Kazuo; Watanabe, Hideomi; Okita, Tsutomu; Ryoke, Katsumi; and Kosha, Hideaki, 4,886,703, Cl. 428-323.000.

S.M.W. Seiko, Inc.: *See*—
Taki, Osamu; and Takeshima, Shigeru, 4,886,400, Cl. 405-267.000.

Saab-Scania Aktiebolag: *See*—
Johansson, Rolf, 4,887,191, Cl. 362-61.000.
Johansson, Sven H.; and Nytomt, Jan G., 4,886,036, Cl. 123-596.000.

Sabban, Joseph C.; Rodier, Jean-Claude; Roussel, Andre ; and Simon, Jacques F., to Centre National de la Recherch Scientifique. Scanning catadioptric ophthalmoscope. 4,886,351, Cl. 351-221.000.

Sabel, Garry J.: *See*—
Eck, Leonard; Liegel, Reinald D.; Naber, Charles; and Sabel, Garry J., 4,886,242, Cl. 254-8.00B.

Sabre Safety Limited: *See*—
Simpson, Keith, 4,886,056, Cl. 128-201.250.

Sachs-Huret S.A.: *See*—
Desenclos, Christian; and Regis, Sinoquet, 4,885,951, Cl. 74-502.200.

Sachtler, J. W. Adriaan; Lawson, R. Joe; and Lambert, Susan L., to UOP. Process for isomerization of alkylaromatics. 4,886,927, Cl. 585-48.100.

Sacks, William: *See*—
Kotliar, Abraham M.; Sacks, William; Sibilia, John P.; and Kumar, Rakesh, 4,886,689, Cl. 428-35.700.

Sadamune, Dean J.; and Fagen, Shawn J., to In Focis Devices Inc. High intensity fiber optic lighting system. 4,887,190, Cl. 362-32.000.

Sagawa, Yuzo: *See*—
Koshihara, Toshio; Misawa, Rokurou; Sagawa, Yuzo; and Takehara, Kimio, 4,886,370, Cl. 374-5.000.

Sage, Ian C.; Chambers, Michael K.; Hittich, Reinhard; and Weber, Georg, to Merck Patent Gesellschaft mit beschrankter Haftung. Liquid crystal phase. 4,886,621, Cl. 252-299.610.

Saika, Toshihiro: *See*—
Gofuku, Ihachiro; Osada, Yoshiyuki; Nakagawa, Katsumi; Hatanaka, Katsunori; Saika, Toshihiro; and Kaifu, Noriyuki, 4,886,977, Cl. 250-578.000.

Saiki, Yoshiharu: *See*—
Kiya, Nobuyuki; Toriyama, Shuji; and Saiki, Yoshiharu, 4,887,220, Cl. 364-474.110.

Saito, Itaru: *See*—
Kitano, Hirohisa; Saito, Itaru; Shingaki, Kouichi; Matsubara, Ken; and Masuda, Tomohiko, 4,887,104, Cl. 350-355.000.

Saito, Keishi; and Fujioka, Yasushi, to Canon Kabushiki Kaisha. Semiconductor device having a semiconductor region in which either the conduction or valence band remains flat while bandgap is continuously graded. 4,887,134, Cl. 357-16.000.

Saito, Naoki: *See*—
Kozuka, Hajime; Saito, Naoki; Morishita, Mitsuharu; and Kohge, Shinichi, 4,886,136, Cl. 180-79.100.

Saito, Shinichi: *See*—
Miyazawa, Kazutoshi; Inukai, Takashi; Inoue, Hiromichi; Saito, Shinichi; and Ohno, Kouji, 4,886,622, Cl. 252-299.610.

Saito, Yoshio: *See*—
Teramoto, Toyokazu; Fujibayashi, Akio; Fukuda, Kozo; Ueda, Mashiro; Nagahashi, S.inichi; Kataoka, Yazuru; Sato, Hiroaki; Wada, Tsunemi; Gino, Takao; Saito, Yoshio; and Morioka, Kiyotaka, 4,886,558, Cl. 148-146.000.

Saitoh, Shiroh: *See*—
Kaneko, Nagao; Wada, Moriyasu; Saitoh, Shiroh; and Honda, Hiroki, 4,886,068, Cl. 128-660.010.

Sakahara, Chisato: *See*—
Tanaka, Eiichiro; Takimoto, Akio; Akiyama, Koji; Onomichi, Kyoko; Watanabe, Masanori; and Sakahara, Chisato, 4,886,719, Cl. 430-58.000.

Sakai, Hiroo: *See*—
Ohsaka, Yohnosuke; Takaki, Shoji; and Sakai, Hiroo, 4,886,581, Cl. 203-80.000.

Sakaki, Yasunori; and Tagomori, Tsutomu, to Strapack Corporation. Band loading apparatus in a packaging machine. 4,885,901, Cl. 53-589.000.

Sakakibara, Masaki: *See*—
Kawamura, Masahide; Sakakibara, Masaki; Watanabe, Teruo; Obauashi, Akira; Hiraoka, Nobutsugu; and Kita, Keiko, 4,886,756, Cl. 435-199.000.

Sakamoto, Kazuho: *See*—
Matsumoto, Takahiro; Suenaga, Haruo; Maehara, Naoyoshi; Sakamoto, Kazuho; Niwa, Takashi; Bessyo, Daisuke; Kusunoki, Shigeru; and Shitaya, Takao, 4,886,951, Cl. 219-10.55B.

Sakamoto, Keiji: *See*—
Kiya, Nobuyuki; and Sakamoto, Keiji, 4,887,012, Cl. 318-434.000.
Kurakake, Mitsuo; and Sakamoto, Keiji, 4,887,015, Cl. 318-609.000.

Sakamoto, Kiichiro: *See*—
Uchiyama, Kaoru; Ishizuka, Tetuya; and Sakamoto, Kiichiro, 4,887,116, Cl. 354-320.000.

Sakamoto, Manabu: *See*—
Hashimoto, Masayuki; Sakamoto, Manabu; Tsutsui, Taizo; Satoh, Satoshi; Kouza, Yukihiko; Murakami, Keikichi; Soga, Tonokatsu; Takeishi, Akira; Takusagawa, Teruhiko; and Hayashi, Misao, 4,885,816, Cl. 15-53.00A.

Sakamoto, Masaaki: *See*—
Kakinuma, Hiroaki; Kasuya, Yukio; Sakamoto, Masaaki; Watanabe, Tsukasa; and Mouri, Mikio, 4,887,166, Cl. 358-471.000.

Sakamoto, Seiji, to Diafoil Company, Limited. Polyphenylene sulfide film. 4,886,705, Cl. 428-328.000.

Sakanoue, Hitoyuki: *See*—
Sasame, Akira; Sakanoue, Hitoyuki; Takeuchi, Hisao; Miyake, Masaya; Yamakawa, Akira; and Yushio, Yasuhisa, 4,886,709, Cl. 428-552.000.

Sakanoue, Kei: *See*—
Nakamura, Koki; Sakanoue, Kei; and Ichijima, Seiji, 4,886,736, Cl. 430-359.000.

Sakashita, Kimiaki; Kouno, Masaaki; and Tsukazaki, Hideo, to Nihon Cement Co., Ltd. Gas filter. 4,886,533, Cl. 55-498.000.

Sakurai, Kazuo; and Tamura, Takahiro, to Hitachi, Ltd. Hermetic scroll compressor with passage group for discharged fluid. 4,886,427, Cl. 417-369.000.

Salamy, Thomas E.; Love, Marvin L., Jr.; and Towner, Mark E., to Olin Hunt Specialty Products Inc. Use of particular mixtures of ethyl lactate and methyl ethyl ketone to remove undesirable peripheral material (e.g. edge beads) from photoresist-coated substrates. 4,886,728, Cl. 430-331.000.

Salanitro, Joseph P.: *See*—
Sundelin, Kurt G. R.; Salanitro, Joseph P.; and Stackhouse, Susan, 4,886,781, Cl. 514-11.000.

Salinaro, Richard F.: *See*—
Gsell, Thomas C.; Salinaro, Richard F.; and Degen, Peter J., 4,886,836, Cl. 521-53.000.

Salter, Avril M.; and O'Reilly, John. Game aparatus. 4,886,278, Cl. 273-242.000.

Sampson, Edward J.: *See*—
Johnston, Jimmie T.; and Sampson, Edward J., 4,886,501, Cl. 604-175.000.

Sandre, Giovanni: *See*—
Neri, Carlo; Nodari, Nereo; and Sandre, Giovanni, 4,886,900, Cl. 560-75.000.

Sano, Masafumi: *See*—
Aoike, Tatsuyuki; Sano, Masafumi; Yoshino, Takehito; Kariya, Toshimitsu; and Niino, Hiroaki, 4,886,723, Cl. 430-65.000.

Sano, Yoshikazu: *See*—
Mano, Hiroshi; Tsurusaki, Masayuki; Sano, Yoshikazu; and Shiomi, Junichi, 4,887,264, Cl. 370-58.200.

Sanofi: *See*—
Castro, Bertrand; and Fehrentz, Jean, 4,886,914, Cl. 564-343.000.

Santa Barbara Research Center: *See*—
Rich, Benjamin K., 4,886,240, Cl. 250-352.000.

Santulli, Scott: *See*—
Glaberson, John; and Santulli, Scott, 4,886,957, Cl. 235-482.000.

Sanyo Electric Co., Ltd.: *See*—
Satow, Aritomo; Masuda, Shinichi; Sugimoto, Kazuyoshi; and Muta, Yuji, 4,886,434, Cl. 418-55.00D.

Saphores Wiedmaier, Eugenio A.; Gleisner Klempau, Arturo G.; Vega de Kuyper, Juan C.; and Mardones Parra, Wladimir A., to Establecimientos Industrales Quimicos Oxiquim S.A. Process of froth flotation using a methylene bisxanthate as a collector reagent. 4,886,595, Cl. 209-166.000.

Sara, Margit: *See*—
Sleytr, Uwe; and Sara, Margit, 4,886,604, Cl. 210-653.000.

Sartor, Mariano; and Gonella, Mario, to Nordica S.p.A. Closure and securing device, particularly for ski boots. 4,885,850, Cl. 36-119.000.

Sasagawa, Katsuyoshi: *See*—
Uehara, Masao; Sasaki, Masahiko; Kanno, Masahide; Hasegawa, Jun; Yamashita, Shinji; and Sasagawa, Katsuyoshi, 4,887,153, Cl. 358-98.000.

Sasage, Tsutomu; and Noguchi, Masahiko, to NEC Corporation. Address reading apparatus for mail article. 4,886,596, Cl. 209-539.000.

Sasaki, Masahiko: *See*—
Uehara, Masao; Sasaki, Masahiko; Kanno, Masahide; Hasegawa, Jun; Yamashita, Shinji; and Sasagawa, Katsuyoshi, 4,887,153, Cl. 358-98.000.

Sasaki, Masaomi: *See*—
Shimada, Tomoyuki; Sasaki, Masaomi; and Hashimoto, Mitsuru, 4,886,846, Cl. 523-453.000.

Sasaki, Seishi: *See*—
Bannai, Tatsushi; Awamoto, Shigeru; Chiba, Mitsuo; and Sasaki, Seishi, 4,887,169, Cl. 358-335.000.

Sasaki, Shigeo: *See*—
Matsumura, Yasushi; Shuhara, Akira; Sasaki, Shigeo; Fukumoto, Kazumi; and Takeya, Hitoshi, 4,886,971, Cl. 250-492.200.

Sasaki, Toshio: *See*—
Ogawa, Masao; and Sasaki, Toshio, 4,886,004, Cl. 112-254.000.

Sasame, Akira; Sakanoue, Hitoyuki; Takeuchi, Hisao; Miyake, Masaya; Yamakawa, Akira; and Yushio, Yasuhisa, to Sumitomo Electric Industries, Ltd. Member for semiconductor apparatus. 4,886,709, Cl. 428-552.000.

Sasaoka, Michio: *See*—
Torii, Shigeru; Taniguchi, Masatoshi; Sasaoka, Michio; Tomotaki, Yoshihisa; Akada, Mitsuo; Tanaka, Hideo; Suzuki, Akira; and Yamashita, Shiro, 4,886,891, Cl. 549-434.000.

Sasaya, Hideaki: *See*—
Iwanami, Shigeki; Inagaki, Mitsuo; Sasaya, Hideaki; Tanaka, Taro; and Kojima, Akikazu, 4,886,423, Cl. 417-222.000.

Satake, Yoshikatsu; Kaneko, Takashi; Kobayashi, Yutaka; Iizuka, Yo; Katto, Takayuki; and Shiiki, Zenya, to Kureha Kagaku Kogyo K. K. Melt-stable poly(arylene thioetherketone) and production process thereof. 4,886,871, Cl. 528-226.000.

Sato, Hiroaki: *See*—
Teramoto, Toyokazu; Fujibayashi, Akio; Fukuda, Kozo; Ueda, Mashiro; Nagahashi, Shinichi; Kataoka, Yazuru; Sato, Hiroaki; Wada, Tsunemi; Gino, Takao; Saito, Yoshio; and Morioka, Kiyotaka, 4,886,558, Cl. 148-146.000.

Sato, Mitsuo: *See*—
Endo, Toshio; and Sato, Mitsuo, 4,887,168, Cl. 358-299.000.

Sato Pharmaceutical Co., Ltd.: *See*—
Kitagaki, Kanshiro; Ebihara, Keiko; Morioka, Shigeo; Nakamura, Takao; and Okada, Taizo, 4,886,667, Cl. 424-195.100.

Sato, Seiichi: *See*—
Shibuya, Kimiyuki; Takahashi, Yoshio; Sato, Seiichi; Shigyo, Hiromichi; Ohta, Tomio; and Uchida, Yasumi, 4,886,822, Cl. 514-357.000.

Sato, Takayuki: *See*—
Tsuchida, Masami; Suzuki, Shiro; Koguchi, Kiichiro; Takahashi, Tokihiro; and Sato, Takayuki, 4,887,170, Cl. 360-15.000.

Sato, Tomio; Matsuoka, Shigeru; Matsuda, Eiji; and Yonenaga, Hitoshi, to Hitachi, Ltd. Document editing apparatus having detachable image reader. 4,887,165, Cl. 358-474.000.

Sato, Yukio: *See*—
Wataya, Masafumi; Sato, Yukio; Ishida, Yoshihiro; and Yamamoto, Tadashi, 4,887,095, Cl. 346-76.0PH.

Satoh, Satoshi: *See*—
Hashimoto, Masayuki; Sakamoto, Manabu; Tsutsui, Taizo; Satoh, Satoshi; Kouza, Yukihiko; Murakami, Keikichi; Soga, Tonokatsu; Takeishi, Akira; Takusagawa, Teruhiko; and Hayashi, Misao, 4,885,816, Cl. 15-53.00A.

Satoh, Shinichi: *See*—
Yoneda, Masahiro; Hatanaka, Masahiro; Kohno, Yoshio; Satoh, Shinichi; Oda, Hidekazu; and Moriizumi, Koichi, 4,887,137, Cl. 357-23.600.

Satow, Aritomo; Masuda, Shinichi; Sugimoto, Kazuyoshi; and Muta, Yuji, to Sanyo Electric Co., Ltd. Scroll compressor having discharge part communicating with two compression spaces simultaneously. 4,886,434, Cl. 418-55.00D.

Sauer, Charles H.: *See*—
Johnson, Donavon W.; Neuman, Grover H.; Sauer, Charles H.; Shaheen-Gouda, Amal A.; and Smith, Todd A., 4,887,204, Cl. 364-200.000.

Sauer, Gerhard: *See*—
Ehnert, Gerd; Ehlers, Manfred; Sauer, Gerhard; and Vogel, Klaus, 4,886,701, Cl. 428-282.000.

Sauter, Robert: *See*—
Reiffen, Manfred; Hurnaus, Rudolf; Sauter, Robert; Grell, Wolfgang; and Rupprecht, Eckhard, 4,886,814, Cl. 514-326.000.

Savyon Diagnostics Limited: *See*—
Ben-Michael, Abraham, 4,886,760, Cl. 436-66.000.

Sawai, Kiyoshi; Yamamoto, Shuuichi; Morokoshi, Hiroshi; Yamamura, Michio; and Muramatsu, Shigeru, to Matsushita Electric Industrial Co., Ltd. Scroll compressor with intermittent oil supply passage. 4,886,435, Cl. 418-55.000.

Sawyer, Philip J.: *See*—
Davidson, James G.; Allard, Deborah A.; Sawyer, Philip J.; and Boynton, Philip E., 4,886,522, Cl. 44-624.000.

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Luke, Charles M.; and Wilson, John B., 4,887,313, Cl. 455-612.000.

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Maxwell, Ian E.; and Minderhoud, Johannes K., 4,886,934, Cl. 585-660.000.
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Ikeno, Masayuki; Fujiki, Hironao; and Inomata, Hiroshi, 4,886,865, Cl. 528-15.000.

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Shin, Masaru: *See*—
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Hinzmann, Alfred; Preisner, Peter M.; and Shu, Timour T., 4,886,077, Cl. 131-282.000.

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Matsumura, Yasushi; Shuhara, Akira; Sasaki, Shigeo; Fukumoto, Kazumi; and Takeya, Hitoshi, 4,886,971, Cl. 250-492.200.

Shulman, Joel I.: *See*—
Charbonneau, Duane L.; Moore, Debra J.; and Shulman, Joel I., 4,886,658, Cl. 424-53.000.

Shupe, Russell D., to Conoco Inc. Process for secondary oil recovery utilizing propoxylated ethoxylated surfactants in seawater. 4,886,120, Cl. 166-274.000.

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Deguchi, Naoyasu; Kamei, Sadao; Goda, Kensuke; Shuto, Sadanobu; and Hayashi, Yasuhiro, 4,886,738, Cl. 430-510.000.

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Kotliar, Abraham M.; Sacks, William; Sibilia, John P.; and Kumar, Rakesh, 4,886,689, Cl. 428-35.700.

Sico Incorporated: *See*—
McNamara, George, 4,885,813, Cl. 5-136.000.

Siegfried Payer, AG: *See*—
Voellm, Ernst B., 4,885,823, Cl. 19-296.000.

Siemens Aktiengesellschaft: *See*—
Brust, Hans-Detlef, 4,887,031, Cl. 324-158.00R.
Christopher, Hans-Gunther; Thurk, Joachim; Noack, Dieter; and Schultz, Thomas, 4,886,944, Cl. 200-48.00R.
Dannhaeuser, Friedrich, 4,887,312, Cl. 455-607.000.
Forster, Josef; and Selinger, Johann, 4,886,635, Cl. 376-268.000.
Haendle, Jorg, 4,886,970, Cl. 250-484.100.
Lenz, Michael, 4,887,181, Cl. 361-103.000.
Magori, Valentin, 4,885,942, Cl. 73-861.280.
Mueller, Karl-Heinz, 4,887,282, Cl. 378-34.000.
Neupauer, Helmut, deceased, 4,887,200, Cl. 363-81.000.
Pekruhn, Wolfgang; Kaiser, Ralf; and Kirchhoff, Hartmut, 4,887,092, Cl. 346-1.100.
Roempp, Claus, 4,887,261, Cl. 370-84.000.
Strandberg, Hans, 4,886,064, Cl. 128-419.0PG.

Siemens Transmission Systems, Inc.: *See*—
Virdee, Nirmal S., 4,887,071, Cl. 340-659.000.

Siepe, Giovanni: *See*—
Villa, Flavio; and Siepe, Giovanni, 4,886,982, Cl. 307-254.000.

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Fernandes, Roosevelt A.; and Sieron, Richard L., 4,886,980, Cl. 307-64.000.

Silence, Joseph A.; and Torres, Randolph. Loose leaf binder. 4,886,390, Cl. 402-80.00R.

Siliconix Limited: *See*—
Jenkins, James O. M., 4,887,295, Cl. 379-362.000.

Sillen, Cornelis W. M. P., to U.S.Philips Corp. Magnetic head having an electro-chemically inert gap of hard material. 4,887,177, Cl. 360-120.000.

Simmons, Robert W.; Stamper, Richard W.; and Kaufman, Thomas P., to GenCorp Inc. Apparatus and method for securing an outer roofing membrane to an insulated roof deck. 4,885,887, Cl. 52-410.000.

Simon, Bela: *See*—
Nemeth, Istvan; Simon, Bela; and Nemeth, Istvan, 4,885,846, Cl. 33-203.130.

Simon, Jacques F.: *See*—
Sabban, Joseph C.; Rodier, Jean-Claude; Roussel, Andre ; and Simon, Jacques F., 4,886,351, Cl. 351-221.000.

Simon, Michael; and Roque, Benjamin. Light-emitting diode display system. 4,887,074, Cl. 340-782.000.

Simon, Myron S., to Polaroid Corporation. Photographic products and processes. 4,886,733, Cl. 430-221.000.

Simone, Kenneth S.: *See*—
Sherman, Charles J.; and Simone, Kenneth S., 4,887,217, Cl. 364-468.000.

Simpson, Howard D., to Union Oil Company of California. Resid hydroprocessing catalyst and method of preparation. 4,886,582, Cl. 502-211.000.

Simpson, James E.; Kamarehi, Mohammed; and Ury, Michael G., to Fusion Systems Corporation. Electrodeless lamp having compound resonant structure. 4,887,192, Cl. 362-265.000.

Simpson, Keith, to Sabre Safety Limited. Breathing apparatus. 4,886,056, Cl. 128-201.250.

Singaram, Bakthan: *See*—
Goralski, Christian T.; Singaram, Bakthan; and Brown, Herbert C., 4,886,924, Cl. 585-318.000.

Singh, Raj N.; and Gaddipati, Achuta R., to General Electric Company. Process for producing a filament-containing composite in a ceramic matrix. 4,886,682, Cl. 427-56.100.

Sire, Jean-Marie, to Ciba-Geigy Corporation. Dyeing cellulose fibres without incurring ending with colorless pyrimidine, triazine, aromatic, furfuryl or quinolinyl compound. 4,886,518, Cl. 8-566.000.

Sirrenberg, Wilhelm; Marhold, Albrecht; and Wachendorff-Neumann, Ulrike, to Bayer Aktiengesellschaft. Furazanylurea acaricides. 4,886,823, Cl. 514-364.000.

Sizer, Phillip S.: *See*—
Perkins, Donald H.; Deaton, Thomas M.; and Sizer, Phillip S., 4,886,114, Cl. 166-65.100.

Skelnik, Debra L.: *See*—
Lindstrom, Richard L.; and Skelnik, Debra L., 4,886,786, Cl. 514-54.000.

SKF Mekanprodukter AB: *See*—
Wengeler, Ulf, 4,886,144, Cl. 184-45.100.

SKF Textilmaschinen-Komponenten GmbH: *See*—
Braun, Ernest, 4,886,991, Cl. 310-212.000.

Skuballa, Werner; Vorbrueggen, Helmut; Dahl, Helmut; Stuerzebecher, Claus-Steffen; and Thierauch, Karl-Heinz, to Schering Aktiengesellschaft. Cyclodextrin clathrates of carbacyclin derivatives and their use as medicinal agents. 4,886,788, Cl. 514-58.000.

Sleytr, Uwe; and Sara, Margit. Structure with membranes having continuous pores. 4,886,604, Cl. 210-653.000.

Sloan, Tod H., to Boise Cascade Corporation. Method and apparatus for producing uniform pulp yields by controlling the operation of a refiner. 4,886,576, Cl. 162-49.000.

Slodki, Morey E.: *See*—
Cadmus, Martin C.; and Slodki, Morey E., 4,886,746, Cl. 435-42.000.

Smariga, Paulette E.: *See*—
Kortright, Kenneth H.; Hofheinz, David E.; Forman, Meryl A.; Lee, Song Y.; Smariga, Paulette E.; and Stoner, Candie S., 4,886,742, Cl. 435-5.000.

Smart, Anthony E.; and Woodward, Roger P., to Titan Corporation, The. System for, and methods of, providing for a determination of the movement of an airborne vehicle in the atmosphere. 4,887,213, Cl. 364-424.010.

Smazik, Kenneth G.: *See*—
Kirschner, Jonathan; Smazik, Kenneth G.; and Paisley, Gary V., 4,886,190, Cl. 222-57.000.

Smeltzer, Thomas: *See*—
Klinedinst, Paul W.; and Smeltzer, Thomas, 4,886,443, Cl. 425-537.000.

Smith, Bobby E.: *See*—
Dallavia, Anthony J., Jr.; Vande Ven, Susan; and Smith, Bobby E., 4,886,839, Cl. 521-124.000.

Smith, Bruce A.: *See*—
Garner, Harrison A., Jr.; Hemphill, Raymond M.; McGraw, John F.; Schmidt, Michael L.; Smith, Bruce A.; and Wert, David E., 4,886,640, Cl. 420-111.000.

Smith Corona Corporation: *See*—
Cappotto, Samuel D., 4,886,385, Cl. 400-234.000.
Mueller, Hans W., 4,886,383, Cl. 400-208.000.

Smith, Cyril: *See*—
Langdon, Roger M.; and Smith, Cyril, 4,887,033, Cl. 324-253.000.

Smith, Joe: *See*—
Bell, David C.; and Smith, Joe, 4,885,967, Cl. 83-520.000.

Smith, John A. S., to National Research Development Corporation. Methods and apparatus for detecting certain compounds. 4,887,034, Cl. 324-307.000.

Smith, Kelvin M.: *See*—
Richtmeyer, Robert D.; and Smith, Kelvin M., 4,886,479, Cl. 464-111.000.

Smith, Neville J. Powered cleaning tools. 4,885,815, Cl. 15-28.000.

Smith, Robbie E.: *See*—
Carter, Daniel C.; and Smith, Robbie E., 4,886,646, Cl. 422-245.000.

Smith, Robert T., to Microelectronics and Computer Technology Corporation. Zero insertion force electrical connector. 4,886,461, Cl. 439-67.000.

Smith, Roger, to United States of America, Army. Bevel gear backlash and clutch device. 4,885,950, Cl. 74-409.000.

Smith, Theodore E.: *See*—
Penkunas, Joseph J.; Smith, Theodore E.; and Burwick, Jack L., 4,886,638, Cl. 419-15.000.

Smith, Thomas E.: *See*—
Rush, Hughey A.; Hibbard, Billy B.; Pursoo, Johnson L.; Lindsay, John W.; Smith, Thomas E.; Harper, Kenneth; Tullos, MIchael V.; and Davis, James E., 4,886,706, Cl. 428-288.000.

Smith, Todd A.: *See*—
Johnson, Donavon W.; Neuman, Grover H.; Sauer, Charles H.; Shaheen-Gouda, Amal A.; and Smith, Todd A., 4,887,204, Cl. 364-200.000.

Snelgrove, R. Vernon: *See*—
McCullough, Francis P., Jr.; Cipriano, Robert A.; and Snelgrove, R. Vernon, 4,886,715, Cl. 429-103.000.

Snow, Paul D., Jr. Quick release face mask for use with contact sports helmets. 4,885,807, Cl. 2-424.000.

Societe anonyme dite: SMH Alcatel: *See*—
Peyre, Jacques, 4,886,566, Cl. 156-361.000.

Societe Industrielle de l'Anhydride Carbonique: *See*—
Castan, Joseph, 4,886,534, Cl. 62-35.000.

Societe Industrielle de Prefabrication Electrique: *See*—
Pourchon, Andre; and Guinamard, Dominique, 4,886,290, Cl. 280-704.000.

Societe Nationale d'Etude et de Construction de Moteurs d'Aviation "S.N.E.C.M.A." : *See*—
Martinou, Robert L.; and Ruimi, Michel M., 4,886,583, Cl. 204-16.000.

Societe Nationale d'Etude et de Construction de Moteurs d'Aviation"S.N.E.C.M.A." : *See*—
Martinou, Robert L.; and Ruimi, Michel M., 4,886,585, Cl. 204-23.000.

Soderquist, Charles E.; and Beck, James P., to Cole-Parmer Instrument Company. Peristaltic pump having independently adjustable cartridges. 4,886,431, Cl. 417-477.000.

Soga, Tonokatsu: *See*—
Hashimoto, Masayuki; Sakamoto, Manabu; Tsutsui, Taizo; Satoh, Satoshi; Kouza, Yukihiko; Murakami, Keikichi; Soga, Tonokatsu; Takeishi, Akira; Takusagawa, Teruhiko; and Hayashi, Misao, 4,885,816, Cl. 15-53.00A.

Sogli, Loris: *See*—
Ungarelli, Raffaele; Beretta, Maurizio A.; and Sogli, Loris, 4,886,923, Cl. 570-210.000.

Solar Scientific, Inc.: *See*—
Cheng, Kuang L., 4,886,584, Cl. 204-1.00T.

Solem, Jan O.; and Pilman, Olev, to Gambro AB. Autotransfusion apparatus. 4,886,487, Cl. 604-5.000.

Sollner, Gerhard: *See*—
Ostermann, Friedrich; Dumont, Christian; Balbach, Rainer; and Sollner, Gerhard, 4,886,713, Cl. 428-687.000.

Somerville, Thomas A., to Burr-Brown Corporation. Current sense amplifier with low, nonlinear input impedance and high degree of signal amplification linearity. 4,887,047, Cl. 330-257.000.

Sony Corporation: *See*—
Matsuzaki, Atsushi; Kobayashi, Hiroyuki; Tomita, Hideo; Kikuchi, Kenichi; Inoue, Kenji; Kondo, Yoshiyuki; Hirayasu, Masatoshi; and Ichise, Atsushi, 4,887,152, Cl. 358-86.000.
Murakami, Yoshikazu; Mizunuma, Yasuyuki; Ohgihara, Takahiro; Nakano, Hiroyuki; Niikura, Kanako; and Okamoto, Tsutomu, 4,887,052, Cl. 331-96.000.

Soper, Peter H. Lens edging machine and method. 4,885,875, Cl. 51-284.00E.

Sorensen, Charles M.; and Varghese, Philip, to Mobil Oil Corporation. Olefin hydration and etherification process employing serially staged olefin introduction. 4,886,918, Cl. 568-697.000.

Sour Pliva: *See*—
Djokic, Slobodan; Lopotar, Nevenka; Kobrehel, Gabrijela; Krnjevic, Hrvoje; and Carevic, Olga, 4,886,792, Cl. 514-183.000.

Southern, Edwin, to Chancellor, Masters and Scholars of the University of Oxford, The. Electrophoresis method and apparatus for separating particles in a separation medium. 4,886,589, Cl. 204-182.800.

Space Age Enterprises, Inc.: *See*—
Lambert, Blair W., 4,885,849, Cl. 36-3.00B.

Spain, Raymond G., to Airfoil Textron Inc. Method of making composite articles. 4,885,973, Cl. 87-1.000.

Spamer, William S., to Mead Corporation, The. Display stand convertible to gravity feed. 4,886,171, Cl. 211-59.200.

Span, Francis J.; Hissel, Leopold H.; and Grassens, Leonardus J., to U.S. Philips Corporation. Patient support system for radiotherapy. 4,885,998, Cl. 108-139.000.

Sparks, Charles, to Institut Francais du Petrole, Alsthom Atlantique; Bouygues Offshore; C.F.E.M.; G.G. Doris. Sea platforms for improving their dynamic balance. 4,886,398, Cl. 405-224.000.

Spaun, Rudiger;: *See*—
Schnell, Peter; Maier-Lehner, Franz; and Spaun, Rudiger;, 4,886,684, Cl. 427-370.000.

Specht, Donald P.: *See*—
Scozzafava, Michael; Specht, Donald P.; Ulman, Abraham; Willand, Craig S.; and Williams, David J., 4,886,339, Cl. 350-96.340.

Specht, Lindley T.: *See*—
Hoke, William E.; Specht, Lindley T.; and Korenstein, Ralph, 4,886,683, Cl. 427-252.000.

Spector, Donald. Household appliance for making frozen food products. 4,885,917, Cl. 62-343.000.

Spek, Dirk P.; and van der Heyden, Leonardus A. Process for the preparation of a coagulated material. 4,886,702, Cl. 428-308.400.

Speranza, George P.: *See—*
Lin, Jiang-Jen; and Speranza, George P., 4,886,867, Cl. 528-111.000.
Lin, Jiang-Jen; and Speranza, George P., 4,886,909, Cl. 564-50.000.

Spiering, Michael W.; and Cunningham, Michael T., to Hunting Oilfield Services Limited. Improvements in and relating to connection assemblies and components thereof. 4,886,300, Cl. 285-26.000.

Spies, Karl-Heinz: *See—*
Ehrmann, Peter; Spies, Karl-Heinz; and Vogt, Rolf, 4,886,281, Cl. 277-47.000.

Splane, Robson L., Jr.: *See—*
Iams, John F.; Splane, Robson L., Jr.; and Drusch, John A., III, 4,886,050, Cl. 128-25.00R.

Sprague, Michael M. Fishing lure retriever. 4,885,863, Cl. 43-17.200.

Square D Company: *See—*
Libert, James T., 4,887,018, Cl. 318-778.000.

SSMC Inc.: *See—*
Jelinek, Vaclav, 4,886,006, Cl. 112-313.000.

Stackhouse, Susan: *See—*
Sundelin, Kurt G. R.; Salanitro, Joseph P.; and Stackhouse, Susan, 4,886,781, Cl. 514-11.000.

Stamper, Richard W.: *See—*
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Standard Oil Company, The: *See—*
Bartek, Joseph P.; Brazdil, James F., Jr.; Hupp, John M.; and Grasselli, Robert K., 4,886,931, Cl. 585-500.000.
Moles, David A.; and Yemington, Charles R., 4,886,395, Cl. 405-169.000.

Starenchak, Robert W.: *See—*
Andrews, Katherine M.; and Starenchak, Robert W., 4,886,401, Cl. 406-182.000.

Starr, Ross T. Measurement of total iron binding capacity. 4,886,642, Cl. 422-58.000.

State of Israel-Ministry of Defence Armament Development Authority: *See—*
Kirson, Yoram; and Marom, Itsak, 4,885,977, Cl. 89-41.050.

Staub, Theodor: *See—*
Ruess, Wilhelm; Urech, Pierre; Eberle, Jurg; and Staub, Theodor, 4,886,824, Cl. 514-383.000.
Ruess, Wilhelm; Urech, Pierre; Eberle, Jurg; and Staub, Theodor, 4,886,825, Cl. 514-383.000.

STC PLC: *See—*
Ojha, Sureshchandra M.; Jennings, Stephen R.; and Johnston, Anthony D., 4,886,569, Cl. 156-643.000.

Steaka-Maka Marketing Pty Limited: *See—*
Corrie, Narelle G.; and Read, Robert J. R., 4,885,822, Cl. 17-39.000.

Steakley, Betty P. Portable liquid cooler. 4,886,176, Cl. 215-229.000.

Steele, Robert B., to Ampex Corporation. Apparatus and method for cueing a video tape recorder. 4,887,172, Cl. 360-73.060.

Steely, Lee W., to AMP Incorporated. Vehicle multiplex system with multifunction switches. 4,887,263, Cl. 370-85.100.

Stefany, James H.: *See—*
Cheney, Glen T.; Kirsch, Howard C.; Nelson, James T.; and Stefany, James H., 4,887,135, Cl. 357-23.600.

Steffen, Hans: *See—*
Cirelli, Giorgio; Steffen, Hans; and Surber, Christian, 4,886,499, Cl. 604-131.000.

Stein, Bernd: *See—*
Lohr, Herbert; Stein, Bernd; Becker, Helmut; Ade, Reiner; and Baur, Walter, 4,885,900, Cl. 53-551.000.

Stein, Israel M.; Goodman, Alan S.; and Romanow, Richard, to Enviro Med, Inc. Containers for medical waste. 4,886,164, Cl. 206-366.000.

Steiner Company, Inc.: *See—*
Cassia, Antonio M., 4,886,192, Cl. 222-181.000.

STEMCOR Corporation: *See—*
Deren, Gary W., 4,885,890, Cl. 52-506.000.

Stepack: *See—*
Courrege, Claude, 4,886,446, Cl. 431-329.000.

Stephen, Robert L.: *See—*
Jacobsen, Stephen C.; Petelenz, Tomasz J.; and Stephen, Robert L., 4,886,489, Cl. 604-20.000.

Stern, Richard A.; and Babbitt, Richard W., to United States of America, Army. Compact microstrip latching reciprocal phase shifter. 4,887,054, Cl. 333-158.000.

Stewart, David R., to Shell Oil Company. Plastic container with enhanced insulation. 4,886,187, Cl. 220-468.000.

Stillwell, James T., to American Monitoring Systems, Inc. System for annunciating emergencies. 4,887,291, Cl. 379-39.000.

Stimmel, Stephanie J. Ice cube maker. 4,886,239, Cl. 249-117.000.

Stinson, Gerald R.: *See—*
Thrasher, Robert P., Jr.; and Stinson, Gerald R., 4,885,948, Cl. 74-89.140.

Stirling Thermal Motors, Inc.: *See—*
Meijer, Roelf J.; and Ziph, Benjamin, 4,885,980, Cl. 92-12.200.

Stoces, Raymond C.: *See—*
Hoffman, Donald B.; Linhart, Joseph J.; and Stoces, Raymond C., 4,886,247, Cl. 266-246.000.

Stockley, Henry W.: *See—*
Davis, Kent A.; Bekele, Solomon; and Stockley, Henry W., 4,886,690, Cl. 428-36.600.

Stohr, Albert. Energy-conducting chain made from plastics material. 4,885,908, Cl. 59-78.100.

Stomp, Anne-Marie: *See—*
Sederoff, Ronald R.; Stomp, Anne-Marie; Moore, Larry W.; and Chilton, Scott W., 4,886,937, Cl. 800-1.000.

Stoner, Candie S.: *See—*
Kortright, Kenneth H.; Hofheinz, David E.; Forman, Meryl A.; Lee, Song Y.; Smariga, Paulette E.; and Stoner, Candie S., 4,886,742, Cl. 435-5.000.

Stott, Ronald A.: *See—*
Bennett, Peter G.; McKinlay, Peter R.; Shaw, Neil W.; and Stott, Ronald A., 4,886,563, Cl. 156-205.000.

Stotz, Gerhard: *See—*
Galie, Louis M.; Sedlak, Adolf; and Stotz, Gerhard, 4,886,988, Cl. 310-49.00R.

Strand, Glen L., to Tyler Limited Partnership. Liquid herbicide attachment for granular applicator. 4,886,208, Cl. 239-77.000.

Strandberg, Hans, to Siemens Aktiengesellschaft. Body activity controlled heart pacer. 4,886,064, Cl. 128-419.0PG.

Strapack Corporation: *See—*
Sakaki, Yasunori; and Tagomori, Tsutomu, 4,885,901, Cl. 53-589.000.

Strasser, Gene W. Leadless current-sensing system. 4,887,027, Cl. 324-117.00H.

Strauser Manufacturing, Inc.: *See—*
Strauser, Michael, 4,887,219, Cl. 364-474.090.

Strauser, Michael, to Strauser Manufacturing, Inc. Board cut-off saw assembly. 4,887,219, Cl. 364-474.090.

Stritzel, Gene A., to D-K Gleason, Inc. Cam action pin locking means for a differential. 4,885,958, Cl. 74-715.000.

Strom, David H., to Strom International, Ltd. Inflatable plastic structure simulating a beverage can or bottle with capped end. 4,885,858, Cl. 40-538.000.

Strom International, Ltd.: *See—*
Strom, David H., 4,885,858, Cl. 40-538.000.

Stroud, Stephen G.: *See—*
Arnost, Michael J.; Inbar, Shai; Meneghini, Frank A.; Palumbo, Paul S.; Stroud, Stephen G.; and Zepp, Charles M., 4,886,744, Cl. 435-6.000.

Strozier, Robert E., to W. P. Stephens Lumber Company. Adjustable radius wood laminating fixture. 4,886,568, Cl. 156-443.000.

Strudel, Werner, to Lindauer Dornier Gesellschaft mbH. Externally held expander for tubular textile fabric. 4,885,826, Cl. 26-80.000.

Strutzel, Hans; and Wink, Peter, to Hoechst Aktiengesellschaft. Process and apparatus for the production of an extruded, stretched, seamless tube. 4,886,634, Cl. 264-560.000.

Stuart, Richard K., Jr.: *See—*
Foster, Bruce W.; Clubb, Clyde N.; and Stuart, Richard K., Jr., 4,886,853, Cl. 524-477.000.

Stuerzebecher, Claus-Steffen: *See—*
Skuballa, Werner; Vorbrueggen, Helmut; Dahl, Helmut; Stuerzebecher, Claus-Steffen; and Thierauch, Karl-Heinz, 4,886,788, Cl. 514-58.000.

Sturtevant, Inc.: *See—*
English, William S., 4,885,832, Cl. 29-401.100.

Stutzman, Ralph. Clothing wear monitoring device. 4,886,010, Cl. 116-308.000.

Sucre Recherches et Developpement: *See—*
de Baynast de Septfontaines, Regis J. M. P.; Brouard, Francois E. M. E.; Baret, Jean-Luc A. G.; Gicquiaux, Yvon G. A. J. M.; and Olsen, Hans S., 4,886,672, Cl. 426-48.000.

Sudrabin, David A.; and Grunau, Klaus, to Fibrestone Inc. Corrosion inhibiting secondary barrier system for underground storage tanks. 4,885,880, Cl. 52-169.600.

Sueda, Noriyoshi; Suzuki, Yoshikuni; Sugai, Toshiji; Yamada, Hiroaki; and Yanai, Makoto, to Nisshin Flour Milling Co., Ltd. Benzimidazole derivatives. 4,886,803, Cl. 514-252.000.

Suenaga, Haruo: *See—*
Matsumoto, Takahiro; Suenaga, Haruo; Maehara, Naoyoshi; Sakamoto, Kazuho; Niwa, Takashi; Bessyo, Daisuke; Kusunoki, Shigeru; and Shitaya, Takao, 4,886,951, Cl. 219-10.55B.

Sugahara, Kenshi: *See—*
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Sugai, Toshiji: *See—*
Sueda, Noriyoshi; Suzuki, Yoshikuni; Sugai, Toshiji; Yamada, Hiroaki; and Yanai, Makoto, 4,886,803, Cl. 514-252.000.

Sugano, Shinichi: *See—*
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Sugimoto, Kazuyoshi: *See—*
Satow, Aritomo; Masuda, Shinichi; Sugimoto, Kazuyoshi; and Muta, Yuji, 4,886,434, Cl. 418-55.00D.

Sugimoto, Tamio: *See—*
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Sugishima, Yasuo, to Sharp Kabushiki Kaisha. Electronic cash register system. 4,887,209, Cl. 364-405.000.

Sugitani, Yuji: *See—*
Mizukami, Hideaki; Mori, Kentaro; Ozeki, Akichika; Kawawa, Takaho; Sugitani, Yuji; Nomura, Hirokazu; Fujioka, Tadashi; and Nakagawa, Hirotaka, 4,886,547, Cl. 75-0.50C.

Sugiura, Takashi; Matsuura, Ichiro; Miyauchi, Fumio; and Chiyoshi, Toyoharu, to Ikeda Bussan Co., Ltd. Method of producing skin-covered pad for seat. 4,886,630, Cl. 264-46.600.

Sugiyama, Masanori; Masutani, Takayoshi; and Shirai, Takao, to Aisin Seiki Kabushiki Kaisha; and Toyota Jidosha Kabushiki Kaisha. Person detecting device. 4,887,024, Cl. 324-61.00R.

Sugiyasu Industries Co., Ltd.: *See*—
Iwahashi, Kunimitsu, 4,886,145, Cl. 187-8.710.
Sukigara, Akihiko: *See*—
Asakura, Osamu; Uchikata, Yoshio; Kawazoe, Kenji; Sukigara, Akihiko; Shibamiya, Yoshikazu; and Mizoguchi, Shigeru, 4,887,096, Cl. 346-76.0PH.
Sumita, Masaki: *See*—
Miyake, Norihisa; and Sumita, Masaki, 4,887,222, Cl. 364-513.000.
Sumitomo Electric Industries: *See*—
Shibano, Yoshizo; Suzuki, Haruo; and Iwai, Tohru, 4,887,090, Cl. 343-711.000.
Sumitomo Electric Industries, Ltd.: *See*—
Sasame, Akira; Sakanoue, Hitoyuki; Takeuchi, Hisao; Miyake, Masaya; Yamakawa, Akira; and Yushio, Yasuhisa, 4,886,709, Cl. 428-552.000.
Summers, Ronald L. Pneumatic torque wrench for valve handwheels. 4,885,962, Cl. 81-57.310.
Sun, Koushun: *See*—
Lill, Mark P.; Li, Edward E.; and Sun, Koushun, 4,886,029, Cl. 123-479.000.
Sundelin, Kurt G. R.; Salanitro, Joseph P.; and Stackhouse, Susan, to International Minerals & Chemical Corp. Substituted 2,3-diphenyl-1,2-dihydroquinoxalines and antibiotics for growths promoting. 4,886,781, Cl. 514-11.000.
Sundstrand Corporation: *See*—
Dussourd, Jules L., 4,886,530, Cl. 55-199.000.
Remstad, Steven C.; and Kassel, John M., 4,886,417, Cl. 415-208.300.
Rodgers, Colin, 4,885,909, Cl. 60-39.020.
Sung, Rodney L.: *See*—
Kapuscinski, Maria M.; Grina, Larry D.; Jones, Ronald E.; and Sung, Rodney L., 4,886,611, Cl. 252-47.000.
Sunnen Products Company: *See*—
Davis, James K.; Althen, Wayne W.; Cloutier, Daniel R.; and Schnitzler, Gerry R., 4,887,221, Cl. 364-474.230.
Sunnen, Robert M.; Vanderwal, Frank E.; and Jackson, Richard S., 4,886,157, Cl. 198-839.000.
Sunnen, Robert M.; Vanderwal, Frank E.; and Jackson, Richard S., to Sunnen Products Company. Workpiece delivery magazine. 4,886,157, Cl. 198-839.000.
Superspine: *See*—
Iams, John F.; Splane, Robson L., Jr.; and Drusch, John A., III, 4,886,050, Cl. 128-25.00R.
Supra Products, Inc.: *See*—
Barrett, Philip D.; Henderson, Walter G.; and Larson, Wayne F., 4,887,292, Cl. 379-103.000.
Surber, Christian: *See*—
Cirelli, Giorgio; Steffen, Hans; and Surber, Christian, 4,886,499, Cl. 604-131.000.
Surgical Systems & Instruments, Inc.: *See*—
Shiber, Samuel, 4,886,490, Cl. 604-22.000.
Surinak, John J. Submergible pump connecting ejector adapter and guide rail assembly. 4,886,426, Cl. 417-360.000.
Sushita Electric Industrial Co., Ltd.: *See*—
Yamazaki, Fumio; and Nakatani, Toshifumi, 4,887,000, Cl. 313-422.000.
Suyama, Takahiro: *See*—
Hayakawa, Toshiro; Suyama, Takahiro; Takahashi, Kosei; and Kondo, Masafumi, 4,887,274, Cl. 372-45.000.
Suzuki, Akira: *See*—
Torii, Shigeru; Taniguchi, Masatoshi; Sasaoka, Michio; Tomotaki, Yoshihisa; Akada, Mitsuo; Tanaka, Hideo; Suzuki, Akira; and Yamashita, Shiro, 4,886,891, Cl. 549-434.000.
Suzuki, Akiyoshi: *See*—
Murakami, Eiichi; Kohno, Michio; and Suzuki, Akiyoshi, 4,886,975, Cl. 250-572.000.
Suzuki, Haruo: *See*—
Shibano, Yoshizo; Suzuki, Haruo; and Iwai, Tohru, 4,887,090, Cl. 343-711.000.
Suzuki, Hiroyoshi: *See*—
Uchinami, Masanobu; Takahashi, Toshihisa; Suzuki, Hiroyoshi; Nishiyama, Ryoji; and Nishida, Shinichi, 4,886,028, Cl. 123-479.000.
Suzuki Jidosha Kogyo Kabushiki Kaisha: *See*—
Umehara, Kazuhiro, 4,887,068, Cl. 340-450.300.
Suzuki, Keizo; Hiraoka, Susumu; and Nishimatsu, Shigeru, to Hitachi, Ltd. Surface treatment and apparatus therefor. 4,886,571, Cl. 156-646.000.
Suzuki, Ken-ichi, to Oki Electric Industry Co., Ltd. Device isolation by etching trench in dielectric on substrate and epitaxially filling the trench. 4,886,763, Cl. 437-61.000.
Suzuki, Kozo: *See*—
Tomobe, Norio; Shimamura, Haruo; Suzuki, Kozo; Taniguchi, Yutaka; and Fujiki, Yuji, 4,886,035, Cl. 123-588.000.
Suzuki, Masaaki: *See*—
Noyori, Ryoji; Suzuki, Masaaki; Yanagisawa, Akira; and Kurozumi, Seizi, 4,886,903, Cl. 560-121.000.
Suzuki, Mitsuru; Ohno, Makoto; and Yamamoto, Isamu, to Toyo Boseki Kabushiki Kaisha. Cellulose ester hollow fiber membrane for plasma separation. 4,886,631, Cl. 264-48.000.
Suzuki, Noriyuki; Tanaka, Atsushi; Kaneko, Kiyoshi; Yoshimura, Yuichiro; Taniishi, Shinnosuke; Kobayashi, Katsuyuki; and Mori, Shigeki, to Canon Kabushiki Kaisha. Coordinates input apparatus. 4,886,943, Cl. 178-18.000.
Suzuki, Ryoichi, to Usui Kokusai Sangyo Kaisha Ltd. Sliding exhaust brake having main valve and auxiliary valve with flow space therebetween. 4,886,148, Cl. 188-273.000.
Suzuki, Shigeaki: *See*—
Onishi, Takashi; Suzuki, Shigeaki; Mori, Toshiki; Fujii, Hiroshi; and Fujita, Yoshiji, 4,886,916, Cl. 568-34.000.
Suzuki, Shigeo; and Yasuda, Kazuyuki, to Kabushiki Kaisha Toshiba. Method for production of sliding member. 4,886,556, Cl. 264-63.000.
Suzuki, Shigeru; Ohshiro, Katsuhiko; and Kasugai, Ichiro, to Kabushiki Kaisha Toyoda Jidoshokki Seisakusho. Lubricating arrangement for a shaft seal in a vane type compressor. 4,886,436, Cl. 418-100.000.
Suzuki, Shigeru: *See*—
Ikeda, Kunihiko; Suzuki, Shigeru; Yokota, Takashi; Shimura, Akira; Kodama, Yutaka; Yamazaki, Shigeru; Niro, Masaichi; and Tomita, Satoru, 4,887,133, Cl. 355-321.000.
Suzuki, Shiro: *See*—
Tsuchida, Masami; Suzuki, Shiro; Koguchi, Kiichiro; Takahashi, Tokihiro; and Sato, Takayuki, 4,887,170, Cl. 360-15.000.
Suzuki, Takeshi: *See*—
Yamagishi, Youji; Akasaka, Kozo; Suzuki, Takeshi; Miyamoto, Mitsuaki; Nakamoto, Kouji; Okano, Kazuo; Abe, Shinya; Ikuta, Hironori; Hayashi, Kenji; Yoshimura, Hiroyuki; Fujimori, Tohru; Harada, Koukichi; and Yamatsu, Isao, 4,886,834, Cl. 514-521.000.
Suzuki, Yoshikuni: *See*—
Sueda, Noriyoshi; Suzuki, Yoshikuni; Sugai, Toshiji; Yamada, Hiroaki; and Yanai, Makoto, 4,886,803, Cl. 514-252.000.
Suzuyama, Tomio; Kosaka, Takayuki; Hayama, Masaki; and Shirai, Tamotsu, to Tachi-S Co., Ltd. Lumbar support device. 4,886,316, Cl. 297-284.000.
Swanson, Carl S. Recreation vehicle distance measuring device. 4,887,281, Cl. 377-24.100.
Swanson, Ronald R.: *See*—
Tuominen, Francis W.; Swanson, Ronald R.; Mattison, Phillip L.; MacKay, Kenneth D.; and Glorvigen, Bradley W., 4,886,888, Cl. 548-497.000.
Swedemed AB: *See*—
Wiksell, Hans, 4,886,060, Cl. 128-303.140.
Sweet, Martin, to Raychem Limited. Circuit protection device. 4,887,182, Cl. 361-117.000.
Sweetland, Roger D.; and Hager, Francis M., to Cummins Engine Company, Inc. Gear train housing of an engine. 4,885,953, Cl. 74-606.00R.
Symbolics, Inc.: *See*—
Holloway, John T.; Moon, David A.; Cannon, Howard I.; Knight, Thomas F.; Edwards, Bruce E.; and Weinreb, Daniel L., 4,887,235, Cl. 364-900.000.
Syntex Inc.: *See*—
Morhenn, Vera, 4,886,745, Cl. 435-7.000.
Syntex (U.S.A.) Inc.: *See*—
Clark, Robin D., 4,886,798, Cl. 514-233.200.
Sypek, Maria T.; and Rorke, Thomas P., to Cookson Graphics Inc. Multilayer photopolymeric printing plates with photoreactive diazo compounds and photopolymerizable compositions. 4,886,731, Cl. 430-156.000.
Szabo, Alice E. Tree ornament. 4,886,688, Cl. 428-7.000.
Tachi-S Co., Ltd.: *See*—
Suzuyama, Tomio; Kosaka, Takayuki; Hayama, Masaki; and Shirai, Tamotsu, 4,886,316, Cl. 297-284.000.
Tackett, Timothy N.: *See*—
Doherty, Paul D.; Tackett, Timothy N.; and Gavin, Lawrence R., 4,886,466, Cl. 439-191.000.
Tagomori, Tsutomu: *See*—
Sakaki, Yasunori; and Tagomori, Tsutomu, 4,885,901, Cl. 53-589.000.
Tai, Seiji: *See*—
Hayashida, Shigeru; Tai, Seiji; Hayashi, Nobuyuki; Iwakabe, Yasushi; Kinjo, Noriyuki; and Numata, Shunichi, 4,886,721, Cl. 430-59.000.
Taiho Pharmaceutical Company Limited: *See*—
Fujii, Setsuro; Yamashita, Jun-ichi; Matsumoto, Hiroshi; Takeda, Setsuo; Terada, Tadafumi; Yasumoto, Mitsugi; and Unemi, Norio, 4,886,877, Cl. 536-23.000.
Tajika, Hiroshi: *See*—
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Tajima, Hatsuo: *See*—
Kinoshita, Masahide; Tajima, Hatsuo; Hoshika, Norihisa; Tajika, Hiroshi; and Hosoi, Atsushi, 4,887,131, Cl. 355-253.000.
Taka, Hideo, to Canon Kabushiki Kaisha. Reset pulse generating device. 4,886,983, Cl. 307-272.300.
Takada, Hiroshi, to Sharp Kabushiki Kaisha. World timepiece. 4,887,251, Cl. 368-21.000.
Takada, Tadashi: *See*—
Kasahara, Riichiro; and Takada, Tadashi, 4,885,929, Cl. 73-23.000.
Takahashi, Akio: *See*—
Katagiri, Junichi; Nagai, Akira; Tawara, Keiko; Takahashi, Akio; Wajima, Motoyo; Narahara, Toshikazu; and Hiraga, Ryo, 4,886,858, Cl. 525-301.000.
Takahashi, Hironori; Tsuchiya, Yutaka; and Aoshima, Shinichiro, to Hamamatsu Photonics Kabushiki Kaisha. Voltage detector for detecting a voltage developing in a selected area of an object. 4,887,026, Cl. 324-96.000.
Takahashi, Kazuo: *See*—
Ota, Masanori; Akutsu, Fumio; and Takahashi, Kazuo, 4,886,857, Cl. 525-74.000.

Takahashi, Kimiyo: *See*—
Sengoku, Masaharu; and Takahashi, Kimiyo, 4,887,173, Cl. 360-78.040.
Takahashi, Koichiro: *See*—
Numasaki, Yoso; Takahashi, Koichiro; and Ohata, Isao, 4,886,818, Cl. 514-345.000.
Takahashi, Kosei: *See*—
Hayakawa, Toshiro; Suyama, Takahiro; Takahashi, Kosei; and Kondo, Masafumi, 4,887,274, Cl. 372-45.000.
Takahashi, Masamoto, to Canon Kabushiki Kaisha. Image data communication apparatus having an image data memory. 4,887,164, Cl. 358-443.000.
Takahashi, Tokihiro: *See*—
Tsuchida, Masami; Suzuki, Shiro; Koguchi, Kiichiro; Takahashi, Tokihiro; and Sato, Takayuki, 4,887,170, Cl. 360-15.000.
Takahashi, Toshihisa: *See*—
Uchinami, Masanobu; Takahashi, Toshihisa; Suzuki, Hiroyoshi; Nishiyama, Ryoji; and Nishida, Shinichi, 4,886,028, Cl. 123-479.000.
Takahashi, Yoshio: *See*—
Shibuya, Kimiyuki; Takahashi, Yoshio; Sato, Seiichi; Shigyo, Hiromichi; Ohta, Tomio; and Uchida, Yasumi, 4,886,822, Cl. 514-357.000.
Takaki, Shoji: *See*—
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Takakura, Hiroshi; and Koizumi, Sachio, to Hitachi, Ltd. Heater for indirectly-heated cathode. 4,886,995, Cl. 313-344.000.
Takara Shuzo Co., Ltd.: *See*—
Kawamura, Masahide; Sakakibara, Masaki; Watanabe, Teruo; Obauashi, Akira; Hiraoka, Nobutsugu; and Kita, Keiko, 4,886,756, Cl. 435-199.000.
Takasago, Hayato: *See*—
Niki, Kenichi; Kokogawa, Tohru; Ishizu, Akira; and Takasago, Hayato, 4,887,030, Cl. 324-158.00P.
Takasago International Corporation: *See*—
Mitsuhashi, Shigeru; Kondo, Hitoshi; Okazaki, Tetsuharu; Endoh, Shinji; Kudo, Hiroko; Yamaguchi, Akio; Tsuruta, Haruki; and Akutagawa, Susumu, 4,886,623, Cl. 252-299.650.
Takats, Imre J.; and Aziz, George W., to Boeing Company, The. Flight control system employing two dual controllers operating a dual actuator. 4,887,214, Cl. 364-424.010.
Takayanagi, Shinji: *See*—
Uehara, Kenji; Takayanagi, Shinji; and Oike, Ikuo, 4,886,149, Cl. 188-306.000.
Takeda Chemical Industries, Ltd.: *See*—
Obayashi, Hisashi; Tanabayashi, Chikara; Asaka, Akiyoshi; and Gotou, Yukio, 4,886,656, Cl. 424-10.000.
Takeda, Mikio; Inage, Masaru; Wada, Hiroshi; Tamaki, Hajime; and Ochiai, Takashi, to Tanabe Seiyaku Co., Ltd. Imidazolidinones as brain activators. 4,886,817, Cl. 514-341.000.
Takeda, Setsuo: *See*—
Fujii, Setsuro; Yamashita, Jun-ichi; Matsumoto, Hiroshi; Takeda, Setsuo; Terada, Tadafumi; Yasumoto, Mitsugi; and Unemi, Norio, 4,886,877, Cl. 536-23.000.
Takeda, Takeshi; Tsuchiya, Sohji; Watanabe, Yoshio; and Sekido, Satoshi, to Matsushita Electric Industrial Co., Ltd. Multi-layered dielectric element. 4,887,186, Cl. 361-321.000.
Takedomi, Yumiko: *See*—
Masaki, Kenji; Osawa, Izumi; Fujiwara, Masanori; Doi, Isao; and Takedomi, Yumiko, 4,886,724, Cl. 430-66.000.
Takegawa, Yujiro, to Tsudakoma Corp. Picking controller for a fluid jet loom. 4,886,094, Cl. 139-452.000.
Takehara, Kimio: *See*—
Koshihara, Toshio; Misawa, Rokurou; Sagawa, Yuzo; and Takehara, Kimio, 4,886,370, Cl. 374-5.000.
Takeishi, Akira: *See*—
Hashimoto, Masayuki; Sakamoto, Manabu; Tsutsui, Taizo; Satoh, Satoshi; Kouza, Yukihiko; Murakami, Keikichi; Soga, Tonokatsu; Takeishi, Akira; Takusagawa, Teruhiko; and Hayashi, Misao, 4,885,816, Cl. 15-53.00A.
Takemura, Yoshihiko: *See*—
Maeda, Takuya; Murakami, Keikichi; Yamada, Tsutomu; Kishimoto, Mitsuharu; Yajima, Kenichi; and Takemura, Yoshihiko, 4,886,246, Cl. 266-157.000.
Takenaka, Mitsuhiko; and Higashiji, Mitsuo, to Kabushiki Kaisha Daikin Seisakusho. Cooling mechanism of a clutch cover assembly. 4,886,153, Cl. 192-113.00A.
Takeshima, Shigeru: *See*—
Taki, Osamu; and Takeshima, Shigeru, 4,886,400, Cl. 405-267.000.
Takeuchi, Hisao: *See*—
Sasame, Akira; Sakanoue, Hitoyuki; Takeuchi, Hisao; Miyake, Masaya; Yamakawa, Akira; and Yushio, Yasuhisa, 4,886,709, Cl. 428-552.000.
Takeuchi, Kunihiko; Akita, Yoshisuke; and Hayakawa, Osamu, to Tokyo Keiki Company Ltd. Control apparatus of variable delivery pump. 4,886,422, Cl. 417-20.000.
Takeya, Hitoshi: *See*—
Matsumura, Yasushi; Shuhara, Akira; Sasaki, Shigeo; Fukumoto, Kazumi; and Takeya, Hitoshi, 4,886,971, Cl. 250-492.200.
Taki, Osamu; and Takeshima, Shigeru, to S.M.W. Seiko, Inc. Side cutting blades for multi-shaft auger system and improved soil mixing wall formation process. 4,886,400, Cl. 405-267.000.
Takimoto, Akio: *See*—
Tanaka, Eiichiro; Takimoto, Akio; Akiyama, Koji; Onomichi, Kyoko; Watanabe, Masanori; and Sakahara, Chisato, 4,886,719, Cl. 430-58.000.
Takizawa, Toshiki: *See*—
Ogawa, Masaki; Shiomura, Yasuro; and Takizawa, Toshiki, 4,886,850, Cl. 524-413.000.
Takusagawa, Teruhiko: *See*—
Hashimoto, Masayuki; Sakamoto, Manabu; Tsutsui, Taizo; Satoh, Satoshi; Kouza, Yukihiko; Murakami, Keikichi; Soga, Tonokatsu; Takeishi, Akira; Takusagawa, Teruhiko; and Hayashi, Misao, 4,885,816, Cl. 15-53.00A.
Tamada, Shigeharu; Fujioka, Takafumi; Ogawa, Hidenori; Teramoto, Shuji; and Kondo, Kazumi, to Otsuka Pharmaceutical Co., Ltd. Carbostyril derivatives and salts thereof. 4,886,809, Cl. 514-312.000.
Tamaki, Hajime: *See*—
Takeda, Mikio; Inage, Masaru; Wada, Hiroshi; Tamaki, Hajime; and Ochiai, Takashi, 4,886,817, Cl. 514-341.000.
Tamargo, Francisco A.: *See*—
Menendez, Francisco J. S.; Menendez, Fernando M. S.; De La Cuadra Herrera, Antonio; Tamargo, Francisco A.; Lorenzo, Luis P.; Valcarcel, Matias R.; and Fernandez, Vicente A., 4,886,648, Cl. 423-92.000.
Tamura, Susan Y.: *See*—
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Asato, Goro; and Tamura, Susan Y., 4,886,829, Cl. 514-450.000.
Asato, Goro; and Tamura, Susan Y., 4,886,830, Cl. 514-450.000.
Tamura, Takahiro: *See*—
Sakurai, Kazuo; and Tamura, Takahiro, 4,886,427, Cl. 417-369.000.
Tamura, Takao: *See*—
Shiraki, Yasushi; and Tamura, Takao, 4,886,933, Cl. 585-522.000.
Tan, Hiroaki; Kato, Koji; Imuta, Junichi; and Kihara, Noriaki, to Mitsui Petrochemical Industries, Ltd. Cyanoguanidine derivative and process for preparation thereof. 4,886,910, Cl. 564-215.000.
Tan, Hiroaki; Yokoyama, Keiichi; and Kihara, Noriaki, to Mitsui Petrochemical Industries, Ltd. Cyanoguanidine derivative and process for preparation thereof. 4,886,912, Cl. 564-240.000.
Tanabayashi, Chikara: *See*—
Obayashi, Hisashi; Tanabayashi, Chikara; Asaka, Akiyoshi; and Gotou, Yukio, 4,886,656, Cl. 424-10.000.
Tanabe, Masaaki: *See*—
Osada, Toshio; and Tanabe, Masaaki, 4,886,429, Cl. 417-413.000.
Tanabe Seivaku Co., Ltd.: *See*—
Tsujihara, Kenji; Arai, Yoshihisa; Ohtsuki, Osamu; and Nakatani, Tadashi, 4,886,894, Cl. 556-40.000.
Tanabe Seiyaku Co., Ltd.: *See*—
Takeda, Mikio; Inage, Masaru; Wada, Hiroshi; Tamaki, Hajime; and Ochiai, Takashi, 4,886,817, Cl. 514-341.000.
Tanaka, Atsushi: *See*—
Suzuki, Noriyuki; Tanaka, Atsushi; Kaneko, Kiyoshi; Yoshimura, Yuichiro; Taniishi, Shinnosuke; Kobayashi, Katsuyuki; and Mori, Shigeki, 4,886,943, Cl. 178-18.000.
Tanaka, Eiichiro; Takimoto, Akio; Akiyama, Koji; Onomichi, Kyoko; Watanabe, Masanori; and Sakahara, Chisato, to Matsushita Electric Industrial Co., Ltd. Electrophotography photosensitive member and a method for fabricating same. 4,886,719, Cl. 430-58.000.
Tanaka, Hideo: *See*—
Torii, Shigeru; Taniguchi, Masatoshi; Sasaoka, Michio; Tomotaki, Yoshihisa; Akada, Mitsuo; Tanaka, Hideo; Suzuki, Akira; and Yamashita, Shiro, 4,886,891, Cl. 549-434.000.
Tanaka, Katsuhiko; and Fukumoto, Hiroshi, to Canon Kabushiki Kaisha. Toner composition containing organotin oxide. 4,886,725, Cl. 430-106.600.
Tanaka, Nobuyuki; Inami, Yasuhiko; Hijikigawa, Masaya; and Kataoka, Shoei, to Sharp Kabushiki Kaisha. Flow sensor. 4,885,937, Cl. 73-189.000.
Tanaka, Shunji; and Umeno, Hidenori, to Hitachi, Ltd. Input-output control method in a virtual machine system. 4,887,202, Cl. 364-200.000.
Tanaka, Taro: *See*—
Iwanami, Shigeki; Inagaki, Mitsuo; Sasaya, Hideaki; Tanaka, Taro; and Kojima, Akikazu, 4,886,423, Cl. 417-222.000.
Tanaka, Toru; and Inari, Masato, to Mitsubishi Gas Chemical Company, Inc. Process for producing 2,6-naphthalene dicarboxylic acid. 4,886,906, Cl. 562-416.000.
Tanaka, Toshinori; Isozumi, Shuzoo; and Konishi, Keiichi, to Mitsubishi Denki Kabushiki Kaisha. Starter. 4,886,306, Cl. 290-48.000.
Tanaka, Yasuyuki; Ibata, Koichi; Mizuno, Masao; Ninagawa, Yoichi; and Nishida, Takashi, to Kuraray Co., Ltd. Polyprenyl composition or compounds and process for the production thereof. 4,886,904, Cl. 560-249.000.
Tanase, Kozo, to Howa Machinery, Ltd. Air-dust separation system for a pneumatic road-cleaning vehicle. 4,885,817, Cl. 15-340.100.
Tanguy, Christian: *See*—
De La Broise, Marc; Tanguy, Christian; and Kervagoret, Gilbert, 4,886,321, Cl. 303-92.000.
Taniguchi, Masatoshi: *See*—
Torii, Shigeru; Taniguchi, Masatoshi; Sasaoka, Michio; Tomotaki, Yoshihisa; Akada, Mitsuo; Tanaka, Hideo; Suzuki, Akira; and Yamashita, Shiro, 4,886,891, Cl. 549-434.000.
Taniguchi, Nobuyaki: *See*—
Inoue, Manabu; Taniguchi, Nobuyaki; Hata, Yoshiaki; Hoda, Takeo; Kudo, Yoshinobu; and Ueda, Hiroshi, 4,887,115, Cl. 354-289.100.

Taniguchi, Nobuyuki; Hoda, Takeo; Hata, Yoshiaki; Inoue, Manabu; Kudo, Yoshinobu; and Ueda, Hiroshi, to Minolta Camera Kabushiki Kaisha. Photographic camera. 4,887,108, Cl. 354-195.100.

Taniguchi, Nobuyuki: *See*—
Ishimura, Toshihiko; Tsuji, Kenji; Taniguchi, Nobuyuki; and Ootsuka, Hiroshi, 4,887,119, Cl. 354-413.000.

Taniguchi, Yutaka: *See*—
Tomobe, Norio; Shimamura, Haruo; Suzuki, Kozo; Taniguchi, Yutaka; and Fujiki, Yuji, 4,886,035, Cl. 123-588.000.

Taniishi, Shinnosuke: *See*—
Mori, Shigeki; Kobayashi, Katsuyuki; Taniishi, Shinnosuke; and Yamamoto, Kousuke, 4,887,245, Cl. 367-129.000.
Suzuki, Noriyuki; Tanaka, Atsushi; Kaneko, Kiyoshi; Yoshimura, Yuichiro; Taniishi, Shinnosuke; Kobayashi, Katsuyuki; and Mori, Shigeki, 4,886,943, Cl. 178-18.000.

Tanikawa, Keiichi: *See*—
Higaki, Yuzo; Goto, Hiroyuki; and Tanikawa, Keiichi, 4,886,612, Cl. 252-49.500.

Tanuma, Seiichi: *See*—
Komatsubara, Kiichi; Tanuma, Seiichi; Okabe, Katsuya; and Katsuyama, Toshio, 4,887,273, Cl. 372-41.000.

Tashiro, Yuuji: *See*—
Arai, Mikiro; Funayama, Osamu; Tashiro, Yuuji; and Isoda, Takeshi, 4,886,860, Cl. 525-474.000.

Tateishi, Kiyoshi, to Pioneer Electronic Corporation. Scanning method and apparatus for performing track jump operations in disk player. 4,887,253, Cl. 369-32.000.

Taureg, Herbert; Wiese, Helmut; and Schonenbrucher, Paul E., to Viscodrive GmbH. Disconnectable transmission assemblies. 4,885,957, Cl. 74-710.500.

Tawara, Keiko: *See*—
Katagiri, Junichi; Nagai, Akira; Tawara, Keiko; Takahashi, Akio; Wajima, Motoyo; Narahara, Toshikazu; and Hiraga, Ryo, 4,886,858, Cl. 525-301.000.

Taylor, John A., to Separation Dynamics, Inc. Method and apparatus for water decontamination. 4,886,603, Cl. 210-641.000.

Taylor, Leland A.: *See*—
Hendren, Gary L.; Provost, Richard L.; Fried, Kim L.; and Taylor, Leland A., 4,886,578, Cl. 162-123.000.

Taylor, Stephen J., to Plessey Overseas Limited. Power supply for a laser diode in a common module. 4,887,271, Cl. 372-29.000.

Taylor, William A. Circular chess/checkers board method of play. 4,886,279, Cl. 273-261.000.

TDK Corporation: *See*—
Matsumura, Tomoya, 4,887,061, Cl. 336-178.000.

Technitrol, Inc.: *See*—
Gaudino, Larry J., 4,886,636, Cl. 419-2.000.

Teijin Limited: *See*—
Noyori, Ryoji; Suzuki, Masaaki; Yanagisawa, Akira; and Kurozumi, Seizi, 4,886,903, Cl. 560-121.000.

Tektronix, Inc.: *See*—
Odenheimer, Ronald P., 4,887,279, Cl. 375-10.000.

Telefonaktiebolaget L M Ericsson: *See*—
Andersson, Ove B.; Berg, Johan; Granestrand, Per O.; and Vatsel, Armand, 4,887,309, Cl. 455-601.000.

Temple, Stephen: *See*—
Michaelis, A. John; Paton, Anthony D.; Temple, Stephen; and Bartky, W. Scott, 4,887,100, Cl. 346-140.00R.

Terada, Tadafumi: *See*—
Fujii, Setsuro; Yamashita, Jun-ichi; Matsumoto, Hiroshi; Takeda, Setsuo; Terada, Tadafumi; Yasumoto, Mitsugi; and Unemi, Norio, 4,886,877, Cl. 536-23.000.

Terai, Haruhiko; and Watanabe, Yasutomo, to Canon Kabushiki Kaisha. Substrate for an ink jet recording head having electrodes formed on a glaze layer, and a recording head and apparatus using the substrate. 4,887,099, Cl. 346-140.00R.

Teramoto, Shuji: *See*—
Tamada, Shigeharu; Fujioka, Takafumi; Ogawa, Hidenori; Teramoto, Shuji; and Kondo, Kazumi, 4,886,809, Cl. 514-312.000.

Teramoto, Toyokazu; Fujibayashi, Akio; Fukuda, Kozo; Ueda, Mashiro; Nagahashi, Shinichi; Kataoka, Yazuru; Sato, Hiroaki; Wada, Tsunemi; Gino, Takao; Saito, Yoshio; and Morioka, Kiyotaka, to NKK Corporation. Method for heat-treating steel rail head. 4,886,558, Cl. 148-146.000.

Teraoka, Masao, to Tochigifujisangyo Kabushiki Kaisha. Power transmission unit. 4,886,152, Cl. 192-58.00B.

Teratoute Oy: *See*—
Tuomaala, Jorma A. K., 4,885,968, Cl. 83-843.000.

Terzian, John, to Raytheon Company. Library image optimization. 4,887,304, Cl. 382-30.000.

Testi, Termano; and Merli, Gabriele, to GTE Telecomunicazioni, S.p.A. Phase shifter-equalizer circuit. 4,887,043, Cl. 328-155.000.

Tetrad Marketing/Sales Ltd.: *See*—
Kuzyk, Andrew, 4,886,326, Cl. 312-257.100.

Tetron, Inc.: *See*—
Wooding, Michael J.; Cardema, Rudolfo S.; and Ramiller, Charles L., 4,886,412, Cl. 414-416.000.

Teulon, Jean-Marie: *See*—
Bru-Magniez, Nicole; Teulon, Jean-Marie; and Launay, Michele, 4,886,805, Cl. 514-253.000.

Tevault, David E.: *See*—
Pellenbarg, Robert E.; and Tevault, David E., 4,886,358, Cl. 356-301.000.

Texaco Chemical Company: *See*—
Lin, Jiang-Jen; and Speranza, George P., 4,886,867, Cl. 528-111.000.
Lin, Jiang-Jen; and Speranza, George P., 4,886,909, Cl. 564-50.000.

Texaco Inc.: *See*—
Chan, Ting Y.; and Colvert, James H., 4,886,644, Cl. 422-140.000.
Kapuscinski, Maria M.; Grina, Larry D.; Jones, Ronald E.; and Sung, Rodney L., 4,886,611, Cl. 252-47.000.
Prada-Silva, Guillermo; Patel, Jitendra A.; and Bhattacharya, Ajit K., 4,886,772, Cl. 502-200.000.

Texas Instruments Incorporated: *See*—
Ayers, Joe W.; and Autery, William D., 4,886,169, Cl. 206-591.000.
Christian, Donald J., 4,887,223, Cl. 364-518.000.
Cook, Brian E.; and Keen, Ralph S., 4,887,144, Cl. 357-50.000.
Davis, Cecil J.; Matthews, Robert T.; Loewenstein, Lee M.; Jucha, Rhett B.; Hildenbrand, Randall C.; and Jones, John I., 4,886,570, Cl. 156-643.000.
Doth, Thomas J., 4,887,013, Cl. 318-489.000.
Krenik, William R.; Hsu, Wei-chan; and Nail, Richard, 4,887,048, Cl. 330-258.000.
Merryman, Jerry D.; and Porter, Vernon R., 4,886,958, Cl. 250-201.000.

Tezuka, Nobuo, to Canon Kabushiki Kaisha. Device for loading recording-medium housing case. 4,887,174, Cl. 360-99.060.

Th. Goldschmidt AG: *See*—
Fink, Hans-Ferdi; Berger, Roland; Heilen, Wernfried; and Muss, Peter, 4,886,551, Cl. 106-183.000.

Thanawalla, Chandrakant B.: *See*—
Chan, Dominic M.; El-Sayed, Lyla M.; Thanawalla, Chandrakant B.; and Trout, Torence J., 4,886,726, Cl. 430-115.000.

Thatcher, G. Lawrence: *See*—
Loewenthal, Bernard; and Thatcher, G. Lawrence, 4,886,454, Cl. 433-72.000.

Thayer, Timothy. Gaffs, automatic gaffs, and mechanisms therefor. 4,885,862, Cl. 43-6.000.

Theiling, Louis F., Jr.: *See*—
Knopf, Robert J.; and Theiling, Louis F., Jr., 4,886,917, Cl. 568-623.000.

Thermco Systems, Inc.: *See*—
Yu, Chorng-Tao; Fisk, Michael A.; and Emami, Alan, 4,886,954, Cl. 219-390.000.

Thermedics, Inc.: *See*—
Poirier, Victor L.; Dasse, Kurt A.; Bowen, Mark A.; and Daly, Benedict D. T., 4,886,502, Cl. 604-175.000.

Thermo King Corporation: *See*—
Arndt, Warren D., 4,885,916, Cl. 62-244.000.

Thermometrics, Inc.: *See*—
Demarest, Philip C., 4,886,070, Cl. 128-675.000.

Thiel, Geoffrey L.; Hodgkiss, Douglas H.; and Tohara, Hisanori, to Kabushiki Kaisha Toshiba. Image processor. 4,887,211, Cl. 364-413.130.

Thierauch, Karl-Heinz: *See*—
Skuballa, Werner; Vorbrueggen, Helmut; Dahl, Helmut; Stuerzebecher, Claus-Steffen; and Thierauch, Karl-Heinz, 4,886,788, Cl. 514-58.000.

Thinesen, Tom, to Timex Corporation. Bicycle watch - dual mode circuit. 4,887,249, Cl. 368-10.000.

Thomas, Gareth J.: *See*—
Lambert, Robert W.; Martin, Joseph A.; and Thomas, Gareth J., 4,886,785, Cl. 514-50.000.

Thomas, Gunther: *See*—
Franckowiak, Gerhard; Marhold, Albrecht; Bechem, Martin; Gross, Rainer; Kayser, Michael; Schramm, Matthias; and Thomas, Gunther, 4,886,816, Cl. 514-338.000.

Thompson, Mortimer S., to Tri-Tech Systems International, Inc. Closure system and method of forming and using same. 4,886,947, Cl. 215-318.000.

Thomson CSF: *See*—
Meyzonnette, Jean L.; Remy, Bertrand; and Pressiat, Robert, 4,887,310, Cl. 455-604.000.

Thornborrow, John W. T. K. Display post. 4,886,235, Cl. 248-225.100.

Thorsson, Conny, to Nobel Chematur AB. Process for the production of ethanol through molasses fermentation. 4,886,751, Cl. 435-162.000.

Thorwesten, Wolfgang: *See*—
Ruecker, Christoph; and Thorwesten, Wolfgang, 4,885,838, Cl. 29-566.300.

Thrasher, Robert P., Jr.; and Stinson, Gerald R., to United Technologies Electro Systems, Inc. Stabilized motor driven actuator. 4,885,948, Cl. 74-89.140.

3-D Dan, Inc.: *See*—
Malott, Michael W., 4,886,687, Cl. 428-4.000.

Thurk, Joachim: *See*—
Christopher, Hans-Gunther; Thurk, Joachim; Noack, Dieter; and Schultz, Thomas, 4,886,944, Cl. 200-48.00R.

Tien, Tseng-Ying, to Board of Regents Acting for and on Behalf of University of Michigan. Toughened ceramics. 4,886,768, Cl. 501-104.000.

Tilman, Menahem: *See*—
Keidar, Itzhak; Dromi, Asher; Tilman, Menahem; and Harel, Joseph, 4,886,161, Cl. 206-246.000.

Timex Corporation: *See*—
Galie, Louis M.; Sedlak, Adolf; and Stotz, Gerhard, 4,886,988, Cl. 310-49.00R.
Thinesen, Tom, 4,887,249, Cl. 368-10.000.

Tindall, John D., to John Waddington PLC. Coating of web materials. 4,886,680, Cl. 427-8.000.

Titan Corporation, The: *See—*
Smart, Anthony E.; and Woodward, Roger P., 4,887,213, Cl. 364-424.010.
Tittle, Douglas L., to Man-Gill Chemical Company. Chemical process control system. 4,886,590, Cl. 204-232.000.
TOA Nenryo Kogyo, K.K.: *See—*
Yoshimura, Narihiko; Komatsu, Yasuji; and Tomizawa, Hirotaka, 4,886,613, Cl. 252-79.000.
Yoshimura, Narihiko; Tomizawa, Hirotaka; and Komatsu, Yasuji, 4,886,614, Cl. 252-79.000.
Toa Nenryo Kogyo Kabushiki Kaisha: *See—*
Arai, Mikiro; Funayama, Osamu; Tashiro, Yuuji; and Isoda, Takeshi, 4,886,860, Cl. 525-474.000.
Tochigifujisangyo Kabushiki Kaisha: *See—*
Teraoka, Masao, 4,886,152, Cl. 192-58.00B.
Todd, Alec: *See—*
Baker, Stephen R.; and Todd, Alec, 4,886,885, Cl. 514-381.000.
Todteberg, Eckhard: *See—*
Grimm, Ekkehard; and Todteberg, Eckhard, 4,886,486, Cl. 494-20.000.
Tohara, Hisanori, to Kabushiki Kaisha Toshiba. Error checking apparatus. 4,887,268, Cl. 371-40.100.
Tohara, Hisanori: *See—*
Thiel, Geoffrey L.; Hodgkiss, Douglas H.; and Tohara, Hisanori, 4,887,211, Cl. 364-413.130.
Toho Titanium Co., Ltd.: *See—*
Shindo, Takuji; Naito, Hiromitsu; Kondo, Masayoshi; Fukuyama, Takashi; Koizumi, Masaaki; and Fukada, Nobuo, 4,886,559, Cl. 148-421.000.
Toikka, Osmo: *See—*
Aaltonen, Olli; Martikainen, Antti; Rantala, Borje; Ekstrom, Jan; and Toikka, Osmo, 4,886,528, Cl. 55-158.000.
Toji, Masuo: *See—*
Chiang, George C.; and Toji, Masuo, 4,886,881, Cl. 544-194.000.
Tojo, Akihiko: *See—*
Kinoshita, Takao; and Tojo, Akihiko, 4,887,160, Cl. 358-213.260.
Toki, Akira: *See—*
Nakao, Kouichi; Toki, Akira; Morisue, Kazushige; and Kobayashi, Hiroyasu, 4,887,073, Cl. 340-693.000.
Tokita, Kiyoshi: *See—*
Inoue, Masatsugu; Tokita, Kiyoshi; and Nakane, Kazunori, 4,886,997, Cl. 313-406.000.
Tokyo Electric Co., Ltd.: *See—*
Ohtaka, Yoshimitsu, 4,885,830, Cl. 29-157.00C.
Tokyo Keiki Company Ltd.: *See—*
Takeuchi, Kunihiko; Akita, Yoshisuke; and Hayakawa, Osamu, 4,886,422, Cl. 417-20.000.
Tolmie, Robert J., Jr., to Pitney Bowes Inc. Driver circuitry for multiple sensors. 4,886,976, Cl. 250-578.000.
Tomioka, Isao: *See—*
Dombou, Munehiko; Tomioka, Isao; Kitabatake, Senji; and Nakejima, Hiroshi, 4,886,749, Cl. 435-89.000.
Tomita, Hideo: *See—*
Matsuzaki, Atsushi; Kobayashi, Hiroyuki; Tomita, Hideo; Kikuchi, Kenichi; Inoue, Kenji; Kondo, Yoshiyuki; Hirayasu, Masatoshi; and Ichise, Atsushi, 4,887,152, Cl. 358-86.000.
Tomita, Satoru: *See—*
Ikeda, Kunihiko; Suzuki, Shigeru; Yokota, Takashi; Shimura, Akira; Kodama, Yutaka; Yamazaki, Shigeru; Niro, Masaichi; and Tomita, Satoru, 4,887,133, Cl. 355-321.000.
Tomizawa, Hirotaka: *See—*
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Yoshimura, Narihiko; Tomizawa, Hirotaka; and Komatsu, Yasuji, 4,886,614, Cl. 252-79.000.
Tomkiewicz, Thaddeus: *See—*
Lenz, William; Patel, Arvind; and Tomkiewicz, Thaddeus, 4,886,942, Cl. 174-135.000.
Tomobe, Norio; Shimamura, Haruo; Suzuki, Kozo; Taniguchi, Yutaka; and Fujiki, Yuji, to Honda Giken Kogyo Kabushiki Kaisha. Air-fuel ratio control method for an internal combustion engine. 4,886,035, Cl. 123-588.000.
Tomotaki, Yoshihisa: *See—*
Torii, Shigeru; Taniguchi, Masatoshi; Sasaoka, Michio; Tomotaki, Yoshihisa; Akada, Mitsuo; Tanaka, Hideo; Suzuki, Akira; and Yamashita, Shiro, 4,886,891, Cl. 549-434.000.
Tootell, Terence S.; Wilson, Keith G.; and Shoptaw, David R., to Hydro-Craft, Inc. Electronic flowmeter system and method. 4,885,943, Cl. 73-861.770.
Torii, Hideo; Aoki, Masaki; Komoda, Hideaki; Aoki, Nobuyuki; Ota, Ikuo; and Ochiai, Keiichi, to Matsushita Electric Industrial Co., Ltd. Platelike magnetic powder and a recording medium which uses the platelike magnetic powder. 4,886,714, Cl. 428-694.000.
Torii, Shigeru; Taniguchi, Masatoshi; Sasaoka, Michio; Tomotaki, Yoshihisa; Akada, Mitsuo; Tanaka, Hideo; Suzuki, Akira; and Yamashita, Shiro, to Otsuka Kagaku Kabushiki Kaisha. Process for preparing 1,1-disubstituted ethylene derivative by reaction of lead with a carbinol derivative. 4,886,891, Cl. 549-434.000.
Torikai, Motoyuki: *See—*
Kamada, Keiichi; Torikai, Motoyuki; and Ohkita, Yasuo, 4,886,704, Cl. 428-323.000.
Toriyama, Shuji: *See—*
Kiya, Nobuyuki; Toriyama, Shuji; and Saiki, Yoshiharu, 4,887,220, Cl. 364-474.110.
Torres, Ghislaine: *See—*
Cyprien Guy; Fisch, Alain; Haggiage, Johnny; Porte, Hugues; Prazuck, Thierry; and Torres, Ghislaine, 4,886,661, Cl. 424-78.000.
Torres, Randolph: *See—*
Silence, Joseph A.; and Torres, Randolph, 4,886,390, Cl. 402-80.00R.
Torrington Company, The: *See—*
Richtmeyer, Robert D.; and Smith, Kelvin M., 4,886,479, Cl. 464-111.000.
Toshiyasu, Masayuki: *See—*
Yamane, Hisakazu; Ishida, Ritsuo; Nakanishi, Hisao; Yanai, Keiji; Toshiyasu, Masayuki; Ikegami, Kazunori; Okuda, Soichiro; Kimura, Kenji; Ishibata, Koji; and Ishii, Yoshinori, 4,886,999, Cl. 313-414.000.
Towner, Mark E.: *See—*
Salamy, Thomas E.; Love, Marvin L., Jr.; and Towner, Mark E., 4,886,728, Cl. 430-331.000.
Toyo Boseki Kabushiki Kaisha: *See—*
Suzuki, Mitsuru; Ohno, Makoto; and Yamamoto, Isamu, 4,886,631, Cl. 264-48.000.
Toyo Denshoku Kabushiki Kaisha: *See—*
Haranoya, Tomoji; and Iwamoto, Shigeki, 4,886,693, Cl. 428-90.000.
Toyo Seikan Kaisha, Limited: *See—*
Gryouda, Toshio; Inaba, Shouichi; Watanabe, Michio; and Yamaguchi, Kanemichi, 4,885,897, Cl. 53-407.000.
Toyonaga, Keiji; and Ueno, Ichiro, to Toyota Jidosha Kabushiki Kaisha; and Tsubakimoto Chain Co. 90 degrees turning device with means for constant angular velocity. 4,886,155, Cl. 198-377.000.
Toyota Jidosha Kabushiki Kaisha: *See—*
Oba, Hidehiro; and Kato, Senji, 4,886,030, Cl. 123-488.000.
Sugiyama, Masanori; Masutani, Takayoshi; and Shirai, Takao, 4,887,024, Cl. 324-61.00R.
Toyonaga, Keiji; and Ueno, Ichiro, 4,886,155, Cl. 198-377.000.
Tracy, David J.: *See—*
Chaudhuri, Ratan K.; Tracy, David J.; and Login, Robert B., 4,886,890, Cl. 548-519.000.
Traenckner, Hans-Joachim: *See—*
Pielartzik, Harald; Dhein, Rolf; Meyer, Rolf-Volker; Traenckner, Hans-Joachim; and Ostlinning, Edgar, 4,886,869, Cl. 528-196.000.
Tran, Dung Q., to Advanced Micro Devices, Inc. ECL PROM programming method and apparatus using ECL addressing means. 4,887,241, Cl. 365-230.050.
Trebino, Rick: *See—*
Gustafson, Eric K.; Trebino, Rick; and Lee, John, 4,886,761, Cl. 436-518.000.
Tretorn AB: *See—*
Peterson, William R., 4,885,851, Cl. 36-127.000.
Tri-Tech Systems International, Inc.: *See—*
Thompson, Mortimer S., 4,886,947, Cl. 215-318.000.
Trigent, Inc.: *See—*
Blaul, Ronald L., 4,886,081, Cl. 134-18.000.
Tronel, Jean-Claude: *See—*
Climent, Jean-Pierre; and Tronel, Jean-Claude, 4,887,180, Cl. 361-91.000.
Trout, Torence J.: *See—*
Chan, Dominic M.; El-Sayed, Lyla M.; Thanawalla, Chandrakant B.; and Trout, Torence J., 4,886,726, Cl. 430-115.000.
Trube, Hans; Korber, Jurgen; and Duenas, Santiago, to Daimler-Benz Aktiengesellschaft. Glove box, particularly for motor vehicles. 4,886,311, Cl. 296-37.120.
True Fitness Technology, Inc.: *See—*
Trulaske, James A., 4,886,266, Cl. 272-69.000.
Trulaske, James A., to True Fitness Technology, Inc. Exercise treadmill. 4,886,266, Cl. 272-69.000.
Trumbull, Christopher J. Hydraulic jack ramp. 4,886,243, Cl. 254-88.000.
Trycomm Technologies, Inc.: *See—*
Unser, Bobby; and Crum, Stephen T., 4,887,086, Cl. 342-20.000.
Trytten, Anne: *See—*
Carden, Matthew J.; Lantz, Kim; Reh, Theresa L.; Trytten, Anne; and Lubino, Yves, 4,887,260, Cl. 370-60.000.
Tsai, Jing-Hwang. Push-type wire terminating apparatus. 4,886,472, Cl. 439-656.000.
Tsai, Nun-Sian: *See—*
Chen, Min-Liang; Leung, Chung W.; Lu, Chih-Yuan; and Tsai, Nun-Sian, 4,886,765, Cl. 437-200.000.
Tsubakimoto Chain Co.: *See—*
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Tsuchida, Masami; Suzuki, Shiro; Koguchi, Kiichiro; Takahashi, Tokihiro; and Sato, Takayuki, to Pioneer Electronic Corporation. Magnetic recording/reproducing apparatus for magnetically reproducing signals from one tape and recording the signals onto a second tape. 4,887,170, Cl. 360-15.000.
Tsuchiya, Sohji: *See—*
Takeda, Takeshi; Tsuchiya, Sohji; Watanabe, Yoshio; and Sekido, Satoshi, 4,887,186, Cl. 361-321.000.
Tsuchiya, Yutaka: *See—*
Takahashi, Hironori; Tsuchiya, Yutaka; and Aoshima, Shinichiro, 4,887,026, Cl. 324-96.000.
Tsuda, Yoshiaki: *See—*
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Tsudakoma Corp.: *See—*
Takegawa, Yujiro, 4,886,094, Cl. 139-452.000.

Tsuji, Kenji: *See*—
Ishimura, Toshihiko; Tsuji, Kenji; Taniguchi, Nobuyuki; and Ootsuka, Hiroshi, 4,887,119, Cl. 354-413.000.

Tsujihara, Kenji; Arai, Yoshihisa; Ohtsuki, Osamu; and Nakatani, Tadashi, to Tanabe Seivaku Co., Ltd. Novel Organic platinum complex and process for the preparation thereof. 4,886,894, Cl. 556-40.000.

Tsujii, Kanji: *See*—
Yajima, Yusuke; and Tsujii, Kanji, 4,887,037, Cl. 324-316.000.

Tsujioka, Hiroshi; Yoneda, Shigeo; and Yatsuzuka, Yasuhumi, to Sharp Kabushiki Kaisha. Image input processor. 4,887,227, Cl. 364-519.000.

Tsukada, Toru, to Nippon Seiko Kabushiki Kaisha. Dust-proof cover for linear guide. 4,886,375, Cl. 384-15.000.

Tsukazaki, Hideo: *See*—
Sakashita, Kimiaki; Kouno, Masaaki; and Tsukazaki, Hideo, 4,886,533, Cl. 55-498.000.

Tsumura, Kiyoaki, to Mitsubishi Denki Kabushiki Kaisha. Capillary tip for bonding a wire. 4,886,200, Cl. 228-1.100.

Tsurusaki, Masayuki: *See*—
Mano, Hiroshi; Tsurusaki, Masayuki; Sano, Yoshikazu; and Shiomi, Junichi, 4,887,264, Cl. 370-58.200.

Tsuruta, Haruki: *See*—
Mitsuhashi, Shigeru; Kondo, Hitoshi; Okazaki, Tetsuharu; Endoh, Shinji; Kudo, Hiroko; Yamaguchi, Akio; Tsuruta, Haruki; and Akutagawa, Susumu, 4,886,623, Cl. 252-299.650.

Tsutsui, Taizo: *See*—
Hashimoto, Masayuki; Sakamoto, Manabu; Tsutsui, Taizo; Satoh, Satoshi; Kouza, Yukihiko; Murakami, Keikichi; Soga, Tonokatsu; Takeishi, Akira; Takusagawa, Teruhiko; and Hayashi, Misao, 4,885,816, Cl. 15-53.00A.

Tullos, MIchael V.: *See*—
Rush, Hughey A.; Hibbard, Billy B.; Pursoo, Johnson L.; Lindsay, John W.; Smith, Thomas E.; Harper, Kenneth; Tullos, MIchael V.; and Davis, James E., 4,886,706, Cl. 428-288.000.

Tuomaala, Jorma A. K., to Teratoute Oy. Mounting of the circularly fitted inserted tooth of a circular saw. 4,885,968, Cl. 83-843.000.

Tuominen, Francis W.; Swanson, Ronald R.; Mattison, Phillip L.; MacKay, Kenneth D.; and Glorvigen, Bradley W., to Henkel Corporation. Extraction of amino an acid from aqueous mixtures thereof. 4,886,888, Cl. 548-497.000.

Turbo Tek Enterprises, Inc.: *See*—
Proctor, Rudy R.; and Reinstein, Fred M., 4,886,212, Cl. 239-315.000.

Turner, Donald M., to Avon Rubber PLC. Bush assembly for track of tracked vehicle. 4,886,324, Cl. 305-42.000.

Turner, James J.; McMillan, Guy H.; Pintelon, Joseph A. E.; Waryu, Joseph C.; Kennon, James L.; and Muller, Peter E., to Nordson Corporation. Modular can coating apparatus. 4,886,013, Cl. 118-668.000.

Turner, John E., to Lattice Semiconductor Corporation. One-time programmable data security system for programmable logic device. 4,887,239, Cl. 365-185.000.

Tyler Limited Partnership: *See*—
Strand, Glen L., 4,886,208, Cl. 239-77.000.

U.S.Philips Corp.: *See*—
Sillen, Cornelis W. M. P., 4,887,177, Cl. 360-120.000.

Uarco Incorporated: *See*—
Schnitzer, David H., 4,886,205, Cl. 229-68.00R.

Uchida, Takashi: *See*—
Hirose, Yoshihiko; Aoki, Tomohiro; Chiku, Kazuyoshi; Murayama, Yasushi; Uchida, Takashi; and Matsuzawa, Kunihiko, 4,887,101, Cl. 346-134.000.

Uchida, Yasumi: *See*—
Shibuya, Kimiyuki; Takahashi, Yoshio; Sato, Seiichi; Shigyo, Hiromichi; Ohta, Tomio; and Uchida, Yasumi, 4,886,822, Cl. 514-357.000.

Uchikata, Yoshio: *See*—
Asakura, Osamu; Uchikata, Yoshio; Kawazoe, Kenji; Sukigara, Akihiko; Shibamiya, Yoshikazu; and Mizoguchi, Shigeru, 4,887,096, Cl. 346-76.0PH.

Uchikawa, Tadao: *See*—
Oota, Takashi; and Uchikawa, Tadao, 4,886,382, Cl. 400-124.000.

Uchinami, Masanobu; Takahashi, Toshihisa; Suzuki, Hiroyoshi; Nishiyama, Ryoji; and Nishida, Shinichi, to Mitsubishi Denki Kabushiki Kaisha. Apparatus for controlling air-fuel ratio of internal combustion engine. 4,886,028, Cl. 123-479.000.

Uchiyama, Kaoru; Ishizuka, Tetuya; and Sakamoto, Kiichiro, to Fuji Photo Film Co., Ltd. Light-sensitive material feeding rack. 4,887,116, Cl. 354-320.000.

Ueda, Hideaki, to Minolta Camera Kabushiki Kaisha. Photosensitive medium having a styryl charge transport material. 4,886,720, Cl. 430-58.000.

Ueda, Hiroshi: *See*—
Inoue, Manabu; Taniguchi, Nobuyaki; Hata, Yoshiaki; Hoda, Takeo; Kudo, Yoshinobu; and Ueda, Hiroshi, 4,887,115, Cl. 354-289.100.
Taniguchi, Nobuyuki; Hoda, Takeo; Hata, Yoshiaki; Inoue, Manabu; Kudo, Yoshinobu; and Ueda, Hiroshi, 4,887,108, Cl. 354-195.100.

Ueda, Mashiro: *See*—
Teramoto, Toyokazu; Fujibayashi, Akio; Fukuda, Kozo; Ueda, Mashiro; Nagahashi, Shinichi; Kataoka, Yazuru; Sato, Hiroaki; Wada, Tsunemi; Gino, Takao; Saito, Yoshio; and Morioka, Kiyotaka, 4,886,558, Cl. 148-146.000.

Uehara, Kenji; Takayanagi, Shinji; and Oike, Ikuo, to Honda Giken Kogyo Kabushiki Kaisha. Rotary type hydraulic damper. 4,886,149, Cl. 188-306.000.

Uehara, Masao; Sasaki, Masahiko; Kanno, Masahide; Hasegawa, Jun; Yamashita, Shinji; and Sasagawa, Katsuyoshi, to Olympus Optical Co., Ltd. Electronic endoscope apparatus using horizontal transfer clock of fixed frequency. 4,887,153, Cl. 358-98.000.

Uehara, Takashi: *See*—
Umegai, Shigehiro; Noguchi, Teruhisa; Morita, Hirobumi; Uehara, Takashi; and Hoshino, Takayuki, 4,885,833, Cl. 29-407.000.

Ueno, Akira: *See*—
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Viani, Umberto. Boilers with catalytic combustion of methane for heating water for domestic use. 4,886,017, Cl. 122-4.00D.
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Schubert, Werner, 4,886,437, Cl. 418-206.000.
Wanlass, Bert R. Door lock actuator. 4,885,954, Cl. 74-625.000.
Ward, deceased, Frederick E.: *See*—
Albarella, James P.; Noell, J. Oakey; Vogelhut, Paul O.; and Ward, deceased, Frederick E., 4,886,625, Cl. 252-500.000.
Warner Manufacturing Company: *See*—
Henke, David R., 4,885,876, Cl. 51-393.000.
Warner, Mark E. Electrical outlet protective cover. 4,886,465, Cl. 439-137.000.
Warner, Samuel R.: *See*—
Feller, Roger K.; Warner, Samuel R.; and Capriotti, Janice D., 4,885,935, Cl. 73-117.200.
Wartenpfuhl, Friedel: *See*—
Jahn-Held, Wilhelm; Lindoerfer, Walter; and Wartenpfuhl, Friedel, 4,886,393, Cl. 405-128.000.
Waryu, Joseph C.: *See*—
Turner, James J.; McMillan, Guy H.; Pintelon, Joseph A. E.; Waryu, Joseph C.; Kennon, James L.; and Muller, Peter E., 4,886,013, Cl. 118-668.000.
Wasek, Raymond T.: *See*—
Mehl, Jack J.; Wasek, Raymond T.; and Desai, Jay, 4,886,071, Cl. 128-760.000.
Washington, Douglas L. Ladies external catheter assembly. 4,886,508, Cl. 604-327.000.

Washington State University Research Foundation: *See*—
Hadwiger, Lee A., 4,886,541, Cl. 71-77.000.

Washio, Katsuyoshi; Nakamura, Tohru; Nakazato, Kazuo; Horiuchi, Masatada; and Hayashida, Tetsuya, to Hitachi, Ltd. Semiconductor device in which electrodes are formed in a self-aligned manner. 4,887,145, Cl. 357-59.000.

Wassilieff, Victor, to Creanova AG. Container closure cap with metering appliance. 4,886,193, Cl. 222-446.000.

Wasterval, Philip W., Jr.; and Armstrong, James E., to IMI Engineering, Co. Well mast structure. 4,885,893, Cl. 52-745.000.

Watanabe, Hideomi: *See*—
Hasumi, Kazuo; Watanabe, Hideomi; Okita, Tsutomu; Ryoke, Katsumi; and Kosha, Hideaki, 4,886,703, Cl. 428-323.000.

Watanabe, Hiroshi; Miura, Osamu; Miyazaki, Kunio; Numata, Shunichi; and Otsuka, Kanji, to Hitachi, Ltd. Process for forming wiring on substrate. 4,886,573, Cl. 156-643.000.

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Tanaka, Eiichiro; Takimoto, Akio; Akiyama, Koji; Onomichi, Kyoko; Watanabe, Masanori; and Sakahara, Chisato, 4,886,719, Cl. 430-58.000.

Watanabe, Michio: *See*—
Gryouda, Toshio; Inaba, Shouichi; Watanabe, Michio; and Yamaguchi, Kanemichi, 4,885,897, Cl. 53-407.000.

Watanabe, Mikio; Shimanuki, Koji; and Nishi, Seiki, to Fuji Photo Film Co., Ltd. Memory cartridge and digital electronic still video camera in which said memory cartridge is freely loadable/unloadable. 4,887,161, Cl. 358-224.000.

Watanabe, Takashi, to Sharp Kabushiki Kaisha. Output signal processor circuit of charge transfer device. 4,886,986, Cl. 307-353.000.

Watanabe, Teruo: *See*—
Kawamura, Masahide; Sakakibara, Masaki; Watanabe, Teruo; Obauashi, Akira; Hiraoka, Nobutsugu; and Kita, Keiko, 4,886,756, Cl. 435-199.000.

Watanabe, Tsukasa: *See*—
Kakinuma, Hiroaki; Kasuya, Yukio; Sakamoto, Masaaki; Watanabe, Tsukasa; and Mouri, Mikio, 4,887,166, Cl. 358-471.000.

Watanabe, Yasutomo: *See*—
Terai, Haruhiko; and Watanabe, Yasutomo, 4,887,099, Cl. 346-140.00R.

Watanabe, Yoshio: *See*—
Takeda, Takeshi; Tsuchiya, Sohji; Watanabe, Yoshio; and Sekido, Satoshi, 4,887,186, Cl. 361-321.000.

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Wataya, Masafumi, to Canon Kabushiki Kaisha. Encoding apparatus for color image data with block-by-block individual quantizing or individual encoding of luminosity, structure, and color information. 4,887,151, Cl. 358-80.000.

Watjen, Frank; and Engelstoft, Mogens, to A/S Ferrosan. Heterocyclic compounds and their preparation and use. 4,886,797, Cl. 514-220.000.

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Wilkinson, Michael J.; Watkins, Robert G., Jr.; and Sell, Edward A., 4,886,282, Cl. 280-4.000.

Watson, Keith G.; and Lovel, Craig G., to ICI Australia Limited. Herbicidal cyclohexane-1,3-dione derivatives. 4,886,911, Cl. 564-221.000.

Watson, Robert B. Negative carrier assembly for omega enlargers. 4,887,127, Cl. 355-75.000.

Watts, Peter D.: *See*—
Bertola, Mauro A.; Marx, Arthur F.; Koger, Hein S.; Quax, Wilhelmus J.; Van der Laken, Cornelis J.; Phillips, Gareth T.; Robertson, Brian W.; and Watts, Peter D., 4,886,750, Cl. 435-136.000.

Wawra, Helmut: *See*—
Scheurenbrand, Dieter; and Wawra, Helmut, 4,886,031, Cl. 123-516.000.

Wawro, Thaddeus J.; English, Stanley R.; and Danna, Dominick, to Welch Allyn, Inc. Lamp assembly and receptacle. 4,887,154, Cl. 358-98.000.

Weber, Georg: *See*—
Sage, Ian C.; Chambers, Michael K.; Hittich, Reinhard; and Weber, Georg, 4,886,621, Cl. 252-299.610.

Weber, Rebecca J.: *See*—
Damico, Joyce A.; and Weber, Rebecca J., 4,886,512, Cl. 609-385.200.

Weber, Roland E., to Applied Biometrics, Incorporated. Endotracheal tube with asymmetric balloon. 4,886,059, Cl. 128-207.150.

Weber S.r.l.: *See*—
Bonfiglioli, Silverio; Fargnoli, Gianni; and Fato, Massimo, 4,886,025, Cl. 123-339.000.

Wedeniwski, Horst J., to Fortuna-Werke Maschinenfabrik GmbH. Method of grinding two or more cams of a camshaft. 4,885,874, Cl. 51-165.770.

Weghmann, Arnold: *See*—
Fottinger, Walter; Hauber, Michael; and Weghmann, Arnold, 4,886,527, Cl. 55-156.000.

Wegner, Gerhard; and Orthmann, Ernst, to BASF Aktiengesellschaft. Layer elements and their production. 4,886,685, Cl. 427-430.100.

Weiler, Werner; and Patzelt, Helmut, to Daimler-Benz AG. Gas producer for filling a gas cushion restraining device. 4,886,293, Cl. 280-736.000.

Weinreb, Daniel L.: *See*—
Holloway, John T.; Moon, David A.; Cannon, Howard I.; Knight, Thomas F.; Edwards, Bruce E.; and Weinreb, Daniel L., 4,887,235, Cl. 364-900.000.

Weinstein, Marshall: *See*—
Bankier, Jack D.; and Weinstein, Marshall, 4,886,166, Cl. 206-387.000.

Weiss, Hardy P., to Lehmann, Martin. Method and apparatus for a non-contact measuring of a temperature of a body. 4,887,229, Cl. 364-557.000.

Weissman, Bernard, to IPCO Corporation. Rotary saw for sectioning dental models. 4,885,965, Cl. 83-100.000.

Weissman, Irving L.: *See*—
Hood, Leroy E.; Weissman, Irving L.; and McGrath, Michael S., 4,886,743, Cl. 435-5.000.

Welch Allyn, Inc.: *See*—
Wawro, Thaddeus J.; English, Stanley R.; and Danna, Dominick, 4,887,154, Cl. 358-98.000.

Welch, Gary E.; Appel, Marvin R.; and Bittle, Jerry R., to Conoco Inc. Method and apparatus for measuring crystal formation. 4,886,354, Cl. 356-70.000.

Welch, Raymond L., to Whirlpool Corporation. Motor control circuit for an eye level range. 4,886,046, Cl. 126-299.00D.

Wella Aktiengesellschaft: *See*—
Konrad, Eugen; and Clausen, Thomas, 4,886,516, Cl. 8-408.000.

Wells, Robert R. Recreational vehicle. 4,886,283, Cl. 280-14.100.

Welton, Wright M.: *See*—
Gerutti, Richard L.; Haskins, David R.; Heithoff, Robert B.; Schwenninger, Ronald L.; and Welton, Wright M., 4,886,539, Cl. 65-135.000.

Wendorff, Joachim: *See*—
Eich, Manfred; and Wendorff, Joachim, 4,886,718, Cl. 430-20.000.

Wengeler, Ulf, to SKF Mekanprodukter AB. Lubricating apparatus for bearings. 4,886,144, Cl. 184-45.100.

Werkzeugmaschinenfabrik Oerlikon-Buhrle AG: *See*—
Bohler, Erwin; and Bruderer, Werner, 4,885,975, Cl. 89-33.250.

Werner, Johannes; Kerschbaum, Walter; and Heinrich, Rolf, to Mercedes-Benz AG. Crankshaft drive of an internal-combustion engine of V-type. 4,886,023, Cl. 123-197.0AC.

Werner, Walter N.; Biscardi, Jeffrey K.; and McClain, Edward L., to United States of America, Navy. Garment pressurizing apparatus. 4,885,930, Cl. 73-37.000.

Wert, David E.: *See*—
Garner, Harrison A., Jr.; Hemphill, Raymond M.; McGraw, John F.; Schmidt, Michael L.; Smith, Bruce A.; and Wert, David E., 4,886,640, Cl. 420-111.000.

West, Edward L.: *See*—
Roberts, Gerald B.; and West, Edward L., 4,886,945, Cl. 200-144.00R.

Westfall, Norman R.; Martini, James A.; and Habbersett, John I., to Caldwell Manufacturing Company. Audibly locking shoe system for take-out window. 4,885,871, Cl. 49-176.000.

Westgaard, Donald J.: *See*—
Brown, Tobias A.; Roos, Scott L.; Biancalana, Donald D.; and Westgaard, Donald J., 4,887,196, Cl. 362-148.000.

Westinghouse Canada Inc.: *See*—
Gagnon, Claude; Gelineau, Claude; Raymond, Pierre; Krzelowski, Zygmunt P.; and Galletly, George, 4,886,940, Cl. 174-88.00B.

Westinghouse Electric Corp.: *See*—
Ammon, Robert L., 4,886,202, Cl. 228-120.000.
Chang, Robert C. W.; Vorndran, Steven C.; and Joseph, Michael F., 4,886,001, Cl. 110-346.000.
Gottlieb, Milton; and Melamed, Nathan T., 4,886,346, Cl. 350-358.000.
Gula, Lance; and McKee, Jere L., 4,887,057, Cl. 335-190.000.
Hemminger, Rodney C., 4,887,029, Cl. 324-142.000.
Male, Andrew J., 4,887,055, Cl. 335-6.000.
Nee, John D.; and Green, Richard A., 4,885,961, Cl. 81-55.000.
Ratliff, Phillip R.; and Bises, George A., 4,887,231, Cl. 364-564.000.
Schmertz, John C., 4,886,348, Cl. 350-622.000.
Scott, William T.; and Leishear, Robert A., 4,886,463, Cl. 439-89.000.
Veronesi, Luciano; and Raimondi, ALbert A., 4,886,430, Cl. 417-423.130.

Wetter, Jakob, to Ferag AG. Apparatus and method for stacking printed products, especially printed products arriving in an imbricated formation. 4,886,265, Cl. 271-279.000.

Weyerhaeuser Company: *See*—
Perdelwitz, Lee E., Jr; Young, Robert H.; Iff, Ron H.; Hanke, David E.; Allison, Kathleen S.; Rahkonen, Raimo K.; and Neogi, Amar N., 4,886,697, Cl. 428-192.000.

Wheeler, Robert L. Servomechanism for sailboats. 4,886,007, Cl. 114-102.000.

Whirlpool Corporation: *See*—
Welch, Raymond L., 4,886,046, Cl. 126-299.00D.

White, Francis E. Massaging bed. 4,886,051, Cl. 128-52.000.

White, Thomas C. Glaucoma drainage the lacrimal system and method. 4,886,488, Cl. 604-9.000.

Whitehead, Howard A.: *See*—
Van Iten, Thomas P.; Whitehead, Howard A.; and Schindel, Julie A., 4,886,632, Cl. 264-156.000.

Whitman, Kent G.: *See*—
Backman, Marvin E.; Finnegan, Stephen A.; Whitman, Kent G.; and Sewell, Robert G. S., 4,885,994, Cl. 102-473.000.

Whittle, Rex W. J., to Astec International Limited. Start circuit for generation of pulse width modulated switching pulses for switch mode power supplies. 4,887,199, Cl. 363-49.000.

Whittleworth, William: *See*—
Docker, Leslie T.; and Whittleworth, William, 4,886,249, Cl. 267-91.000.

Whorton, Robert B., III. Portable concession stand. 4,886,286, Cl. 280-47.350.

Wichterle, Otto, to Ceskoslovenska Akademie ved. Perforated soft contact lens and a method for manufacturing thereof. 4,886,350, Cl. 351-160.00H.

Widemann, Ernst: *See—*
Bauer, Walter; Schmidt, Manfred; and Widemann, Ernst, 4,887,284, Cl. 378-173.000.

Wiese, Helmut: *See—*
Taureg, Herbert; Wiese, Helmut; and Schonenbrucher, Paul E., 4,885,957, Cl. 74-710.500.

Wiksell, Hans, to Swedemed AB. Equipment for use in surgical operations to remove tissue. 4,886,060, Cl. 128-303.140.

Wiktor, Dominik M., to Medtronic, Inc. Intravascular radially expandable stent and method of implant. 4,886,062, Cl. 128-343.000.

Wild, Peter M.; Vickers, Geoffrey W.; Hopkin, David A.; and Moilliet, Antony, to Canada, Her Majesty the Queen in right of. Centrifugal reverse-osmosis desalination unit. 4,886,597, Cl. 210-321.680.

Wild West Artwear, Inc.: *See—*
Mason, Billie M., 4,885,805, Cl. 2-244.000.

Wiley, William E., to Kamyr, Inc. Method and apparatus for mixing oxygen gas with medium consistency pulp in a pump discharge. 4,886,577, Cl. 162-52.000.

Wilkinson, Michael J.; Watkins, Robert G., Jr.; and Sell, Edward A., to General Transervice, Inc. Hydrant refueler. 4,886,282, Cl. 280-4.000.

Wiland, Craig S.: *See—*
Scozzafava, Michael; Specht, Donald P.; Ulman, Abraham; Wiland, Craig S.; and Williams, David J., 4,886,339, Cl. 350-96.340.

Willett, Russell G.: *See—*
Krause, Alan E., II; and Willett, Russell G., 4,886,287, Cl. 280-246.000.

Willey, Monroe J.; and Evert, Daniel D., to General Foods Corporation. Microwave carton. 4,886,170, Cl. 206-609.000.

Williams, David J.: *See—*
Scozzafava, Michael; Specht, Donald P.; Ulman, Abraham; Wiland, Craig S.; and Williams, David J., 4,886,339, Cl. 350-96.340.

Williams, Jeffrey A.: *See—*
Dicke, Grant D.; and Williams, Jeffrey A., 4,886,232, Cl. 248-576.000.

Williams, Jerry K., to General Motors Corporation. Elastic membrane seat with fluidic bladder tensioning method. 4,885,827, Cl. 29-91.100.

Williamson, Malcolm J.: *See—*
Cummins, Kenneth L.; Hecox, Kurt E.; and Williamson, Malcolm J., 4,887,299, Cl. 381-68.400.

Willinger, Allan H.: *See—*
Itakura, Tsuyoshi; and Willinger, Allan H., 4,886,093, Cl. 137-855.000.

Willinger, Brothers, Inc.: *See—*
Itakura, Tsuyoshi; and Willinger, Allan H., 4,886,093, Cl. 137-855.000.

Willis, Mark E.; Ranganayaki, Rambabu P.; Shirley, Thomas E.; and Lee, Stan Y. C., to Mobil Oil Corporation. Method for seismic trace interpolation using a forward and backward application of wave equation datuming. 4,887,244, Cl. 367-73.000.

Willis, Michael A., to Allen, Michael. Temples-less eyeglass frame. 4,886,349, Cl. 351-111.000.

Wilson, John B.: *See—*
Luke, Charles M.; and Wilson, John B., 4,887,313, Cl. 455-612.000.

Wilson, Keith G.: *See—*
Tootell, Terence S.; Wilson, Keith G.; and Shoptaw, David R., 4,885,943, Cl. 73-861.770.

Wilson, Richard A.; Butler, Jerry F.; Withycombe, Donald A.; Mookherjee, Braja D.; Katz, Ira; and Schrankel, Kenneth R., to International Flavors & Fragrances Inc.; and University of Florida, The. Use of alpha-terpineol as insect attractant. 4,886,662, Cl. 424-84.000.

Wilson, Robert T.: *See—*
Davis, James R.; and Wilson, Robert T., 4,886,241, Cl. 251-214.000.

Wincklhofer, Robert C., to Allied-Signal Inc. Cut resistant jacket for ropes, webbing, straps, inflatables and the like. 4,886,691, Cl. 428-68.000.

Wind Feather, United Science Asc.: *See—*
Danson, David P., 4,886,421, Cl. 416-236.00R.

Winfried, Arnold; Hesse, Horst; and Schumacher, Werner, to Robert Bosch GmbH. Control device for position-control of implement coupled to an agricultural vehicle. 4,886,123, Cl. 172-7.000.

Wink, Peter: *See—*
Strutzel, Hans; and Wink, Peter, 4,886,634, Cl. 264-560.000.

Winkler, Ekhard: *See—*
Denzinger, Walter; Hartmann, Heinrich; Gockel, Ulrich; Richter, Felix; Raubenheimer, Hans-Jurgen; and Winkler, Ekhard, 4,886,859, Cl. 525-327.800.

Wintershall Aktiengesellschaft: *See—*
Jahn-Held, Wilhelm; Lindoerfer, Walter; and Wartenpfuhl, Friedel, 4,886,393, Cl. 405-128.000.

Wirth, Hermann O.; and Friedrich, Hans-Helmut, to Ciba-Geigy Corporation. Lubricant compositions, novel glucamine derivatives and complex compounds containing same. 4,886,610, Cl. 252-32.500.

Wirth, Ronald P.: *See—*
Mattison, Phillip L.; Wirth, Ronald P.; Virnig, Michael J.; and Krbechek, LeRoy, 4,886,889, Cl. 548-497.000.

Wish-Bon, Inc.: *See—*
Arenson, Herbert; and Jordan, Ann K., 4,886,270, Cl. 273-139.000.

Withycombe, Donald A.: *See—*
Wilson, Richard A.; Butler, Jerry F.; Withycombe, Donald A.; Mookherjee, Braja D.; Katz, Ira; and Schrankel, Kenneth R., 4,886,662, Cl. 424-84.000.

Witte, Horst, to Horst Witte Entwicklungs-und Vertriebs KG. Device for fixing workpieces to a table. 4,886,257, Cl. 269-9.000.

Wolfe, Raymond, to American Telephone and Telegraph Company. Optical systems with thin film polarization rotators and method for fabricating such rotators. 4,886,332, Cl. 350-96.120.

Wolrich, Gilbert M.; McLellan, Edward J.; and Yodlowski, Robert A. J., to Digital Equipment Corporation. Apparatus and method for performing a shift operation in a multiplier array circuit. 4,887,232, Cl. 364-754.000.

Wong, Vernon G.: *See—*
Ingalz, Thomas J.; Gin, Jerry B.; and Wong, Vernon G., 4,886,066, Cl. 128-645.000.

Wood, Charles H., to Fusion Systems Corporation. Electrodeless lamp bulb of modified shape for providing uniform emmission of radiation. 4,887,008, Cl. 315-39.000.

Wooding, Michael J.; Cardema, Rudolfo S.; and Ramiller, Charles L., to Tetron, Inc. Method and system for loading wafers. 4,886,412, Cl. 414-416.000.

Woodring, William J.; and Horner, Charles J., Jr., to GAF Corporation. Solar roofing assembly. 4,886,554, Cl. 136-244.000.

Woodward, Roger P.: *See—*
Smart, Anthony E.; and Woodward, Roger P., 4,887,213, Cl. 364-424.010.

Woodworth, Lawrence M.: *See—*
Hayes, Michael E.; Hrebenar, Kevin R.; Minor, Jennifer L.; and Woodworth, Lawrence M., 4,886,519, Cl. 44-51.000.

Woollenweber, William E.; and Beck, Niels J. Internal combustion engine turbosystem and method. 4,885,911, Cl. 60-597.000.

Wright, Nigel, to British Gas PLC. Method and apparatus for removing concrete coating from a pipe. 4,886,040, Cl. 125-23.00R.

Wright, Robert L. Two-by-four corner members. 4,885,883, Cl. 52-280.000.

Wunderlich, Klaus, to Daimler-Benz Aktiengesellschaft. Exhaust-gas turbocharger for an internal-combustion engine. 4,886,416, Cl. 415-158.000.

Wurl, Michael: *See—*
Walenta, Rainer; Muller-Peddinghaus, Reiner; Ban, Ivan; Wurl, Michael; and Preuschoff, Ulf, 4,886,806, Cl. 514-253.000.

Wuu, George. Advanced state of the art movie theater. 4,885,878, Cl. 52-6.000.

Xerox Corporation: *See—*
Grushkin, Bernard; Hutka, David E.; Isganitis, Louis V.; and Radigan, Edward J., 4,886,729, Cl. 430-114.000.
Hawkins, William G.; and Pond, Stephen F., 4,887,098, Cl. 346-140.00R.
Law, Kock-Yee; and Bailey, F. Courtney, 4,886,722, Cl. 430-59.000.

Yafuso, Masao; and Hui, Henry K., to Minnesota Mining and Manufacturing Company. Optical fiber event sensor. 4,886,338, Cl. 350-96.290.

Yagi, Toru; and Matsuki, Hideo, to Honda Giken Kogyo Kabushiki Kaisha. Torque sensor. 4,885,944, Cl. 73-862.360.

Yagihara, Hiroshi; Goto, Yukihisa; Masamoto, Kazuhisa; Morishima, Yasuo; and Osabe, Hirokazu, to Daicel Chemical Industries Ltd. Pyrone-3-carboxamide compounds and herbicidal composition thereof. 4,886,546, Cl. 71-88.000.

Yajima, Kenichi: *See—*
Maeda, Takuya; Murakami, Keikichi; Yamada, Tsutomu; Kishimoto, Mitsuharu; Yajima, Kenichi; and Takemura, Yoshihiko, 4,886,246, Cl. 266-157.000.

Yajima, Yusuke; and Tsujii, Kanji, to Hitachi, Ltd. Electron spin resonance spectrometer. 4,887,037, Cl. 324-316.000.

Yale, O. Sherman. Power transmission. 4,885,956, Cl. 74-710.500.

Yamada, Hiroaki: *See—*
Sueda, Noriyoshi; Suzuki, Yoshikuni; Sugai, Toshiji; Yamada, Hiroaki; and Yanai, Makoto, 4,886,803, Cl. 514-252.000.

Yamada, Hitoshi: *See—*
Noguchi, Yasuhiro; Yamada, Hitoshi; and Funyu, Yukio, 4,887,230, Cl. 364-560.000.

Yamada, Keiichi: *See—*
Koshiba, Mitsunobu; Yamada, Keiichi; Harita, Yoshiyuki; Kawamura, Shin'ichi; and Furuto, Yuuji, 4,886,565, Cl. 156-345.000.

Yamada, Takahiro, to Aisin Seiki Kabushiki Kaisha. Broadcasting receiver for vehicles. 4,887,091, Cl. 343-714.000.

Yamada, Tsutomu: *See—*
Maeda, Takuya; Murakami, Keikichi; Yamada, Tsutomu; Kishimoto, Mitsuharu; Yajima, Kenichi; and Takemura, Yoshihiko, 4,886,246, Cl. 266-157.000.

Yamada, Yasuaki, to Canon Kabushiki Kaisha. Data input apparatus. 4,887,082, Cl. 341-26.000.

Yamagishi, Youji; Akasaka, Kozo; Suzuki, Takeshi; Miyamoto, Mitsuaki; Nakamoto, Kouji; Okano, Kazuo; Abe, Shinya; Ikuta, Hironori; Hayashi, Kenji; Yoshimura, Hiroyuki; Fujimori, Tohru; Harada, Koukichi; and Yamatsu, Isao, to Eisai Co., Ltd. Diphenylmethane compounds useful in the treatment of diseases caused by aggregation of platelets or formation of thrombus. 4,886,834, Cl. 514-521.000.

Yamaguchi, Akio: *See—*
Mitsuhashi, Shigeru; Kondo, Hitoshi; Okazaki, Tetsuharu; Endoh, Shinji; Kudo, Hiroko; Yamaguchi, Akio; Tsuruta, Haruki; and Akutagawa, Susumu, 4,886,623, Cl. 252-299.650.

Yamaguchi, Kanemichi: *See—*
Gryouda, Toshio; Inaba, Shouichi; Watanabe, Michio; and Yamaguchi, Kanemichi, 4,885,897, Cl. 53-407.000.

Yamaguchi, Seiji, to Matsushita Electric Industrial Co., Ltd. Priority encoder. 4,887,084, Cl. 341-160.000.

Yamaguchi, Shizuka: *See*—
Yanagawa, Hisaharu; Ochiai, Toshihiro; Miyazawa, Hidenisa; Yamaguchi, Shizuka; Fumeno, Tsuyoshi; Raijo, Hiroshi; and Ohmizu, Seiji, 4,886,335, Cl. 350-96.200.

Yamakawa, Akira: *See*—
Sasame, Akira; Sakanoue, Hitoyuki; Takeuchi, Hisao; Miyake, Masaya; Yamakawa, Akira; and Yushio, Yasuhisa, 4,886,709, Cl. 428-552.000.

Yamamoto, Hideo: *See*—
Nishiyama, Masakazu; Shinbori, Takeyoshi; and Yamamoto, Hideo, 4,886,256, Cl. 267-221.000.

Yamamoto, Isamu: *See*—
Suzuki, Mitsuru; Ohno, Makoto; and Yamamoto, Isamu, 4,886,631, Cl. 264-48.000.

Yamamoto, Kousuke: *See*—
Mori, Shigeki; Kobayashi, Katsuyuki; Taniishi, Shinnosuke; and Yamamoto, Kousuke, 4,887,245, Cl. 367-129.000.

Yamamoto, Masato; Nakajima, Masahiro; and Yamanaka, Toshimasa, to Asahi Kogaku Kogyo Kabushiki Kaisha. Back-cover release device for a camera. 4,887,114, Cl. 354-288.000.

Yamamoto, Mayjue A., to General Motors Corporation. Blind cable assembly. 4,886,134, Cl. 188-20.000.

Yamamoto, Shuuichi: *See*—
Sawai, Kiyoshi; Yamamoto, Shuuichi; Morokoshi, Hiroshi; Yamamura, Michio; and Muramatsu, Shigeru, 4,886,435, Cl. 418-55.000.

Yamamoto, Tadashi: *See*—
Wataya, Masafumi; Sato, Yukio; Ishida, Yoshihiro; and Yamamoto, Tadashi, 4,887,095, Cl. 346-76.0PH.

Yamamoto, Takeshi; and Arai, Masanori, to Mitutoyo Corporation. Inner diameter measuring machine. 4,885,845, Cl. 33-544.500.

Yamamura, Michio: *See*—
Sawai, Kiyoshi; Yamamoto, Shuuichi; Morokoshi, Hiroshi; Yamamura, Michio; and Muramatsu, Shigeru, 4,886,435, Cl. 418-55.000.

Yamamura, Sigeyuki: *See*—
Nakamura, Yasuhide; and Yamamura, Sigeyuki, 4,887,210, Cl. 364-405.000.

Yamanaka, Toshimasa: *See*—
Yamamoto, Masato; Nakajima, Masahiro; and Yamanaka, Toshimasa, 4,887,114, Cl. 354-288.000.

Yamane, Hisakazu; Ishida, Ritsuo; Nakanishi, Hisao; Yanai, Keiji; Toshiyasu, Masayuki; Ikegami, Kazunori; Okuda, Soichiro; Kimura, Kenji; Ishibata, Koji; and Ishii, Yoshinori, to Mitsubishi Denki Kabushiki Kaishi. Cathode ray tube apparatus with quadrupole electrode structure. 4,886,999, Cl. 313-414.000.

Yamanouchi Pharmaceutical Co., Ltd.: *See*—
Numasaki, Yoso; Takahashi, Koichiro; and Ohata, Isao, 4,886,818, Cl. 514-345.000.

Yamaoka, Kojiro; Azuma, Toshiro; Yano, Kazuhiko; and Ohashi, Ryota, to Kanzaki Kokyukoki Mfg. Co. Ltd. Hydraulic four-wheel drive system. 4,886,142, Cl. 180-242.000.

Yamasaki, Katuhiko: *See*—
Eshima, Taizo; Yasutake, Kunihiro; and Yamasaki, Katuhiko, 4,885,837, Cl. 29-564.000.

Yamashita, Jun-ichi: *See*—
Fujii, Setsuro; Yamashita, Jun-ichi; Matsumoto, Hiroshi; Takeda, Setsuo; Terada, Tadafumi; Yasumoto, Mitsugi; and Unemi, Norio, 4,886,877, Cl. 536-23.000.

Yamashita, Shinji: *See*—
Uehara, Masao; Sasaki, Masahiko; Kanno, Masahide; Hasegawa, Jun; Yamashita, Shinji; and Sasagawa, Katsuyoshi, 4,887,153, Cl. 358-98.000.

Yamashita, Shiro: *See*—
Torii, Shigeru; Taniguchi, Masatoshi; Sasaoka, Michio; Tomotaki, Yoshihisa; Akada, Mitsuo; Tanaka, Hideo; Suzuki, Akira; and Yamashita, Shiro, 4,886,891, Cl. 549-434.000.

Yamasoe, Katsuyoshi; Yasuhara, Kiyotado; and Ikeda, Satoshi, to Amchem Products, Inc. Aluminum surface cleaning agent. 4,886,616, Cl. 252-142.000.

Yamatsu, Isao: *See*—
Yamagishi, Youji; Akasaka, Kozo; Suzuki, Takeshi; Miyamoto, Mitsuaki; Nakamoto, Kouji; Okano, Kazuo; Abe, Shinya; Ikuta, Hironori; Hayashi, Kenji; Yoshimura, Hiroyuki; Fujimori, Tohru; Harada, Koukichi; and Yamatsu, Isao, 4,886,834, Cl. 514-521.000.

Yamawaki, Masami: *See*—
Ikenaga, Yukio; and Yamawaki, Masami, 4,886,851, Cl. 524-425.000.

Yamazaki, Etsuo: *See*—
Karube, Norio; Egawa, Akira; Yamazaki, Etsuo; Iehisa, Nobuaki; and Manabe, Mitsuo, 4,887,272, Cl. 372-38.000.

Yamazaki, Fumio; and Nakatani, Toshifumi, to Sushita Electric Industrial Co., Ltd. Electron beam generation apparatus. 4,887,000, Cl. 313-422.000.

Yamazaki, Shigeru: *See*—
Ikeda, Kunihiko; Suzuki, Shigeru; Yokota, Takashi; Shimura, Akira; Kodama, Yutaka; Yamazaki, Shigeru; Niro, Masaichi; and Tomita, Satoru, 4,887,133, Cl. 355-321.000.

Yanagawa, Hisaharu; Ochiai, Toshihiro; Miyazawa, Hidenisa; Yamaguchi, Shizuka; Fumeno, Tsuyoshi; Raijo, Hiroshi; and Ohmizu, Seiji, to Furukawa Electric Co., Ltd. Optical fiber switch system. 4,886,335, Cl. 350-96.200.

Yanagisawa, Akira: *See*—
Noyori, Ryoji; Suzuki, Masaaki; Yanagisawa, Akira; and Kurozumi, Seizi, 4,886,903, Cl. 560-121.000.

Yanai, Keiji: *See*—
Yamane, Hisakazu; Ishida, Ritsuo; Nakanishi, Hisao; Yanai, Keiji; Toshiyasu, Masayuki; Ikegami, Kazunori; Okuda, Soichiro; Kimura, Kenji; Ishibata, Koji; and Ishii, Yoshinori, 4,886,999, Cl. 313-414.000.

Yanai, Makoto: *See*—
Sueda, Noriyoshi; Suzuki, Yoshikuni; Sugai, Toshiji; Yamada, Hiroaki; and Yanai, Makoto, 4,886,803, Cl. 514-252.000.

Yang, Frank Y.: *See*—
Shenoy, Vittal U.; Yang, Frank Y.; and York, James R., 4,887,129, Cl. 355-218.000.

Yano, Kazuhiko: *See*—
Yamaoka, Kojiro; Azuma, Toshiro; Yano, Kazuhiko; and Ohashi, Ryota, 4,886,142, Cl. 180-242.000.

Yao, Koji, to Danippon Screen Mfg. Co., Ltd. Method and device for controlling exposure beams. 4,887,225, Cl. 364-518.000.

Yard, Sabrina M.: *See*—
Brostrom, Gerald M.; Japuntich, Daniel A.; and Yard, Sabrina M., 4,886,058, Cl. 128-206.120.

Yaremenko, Vladimir L.: *See*—
Puzrin, Leonid G.; Atroshenko, Miron G.; Yaremenko, Vladimir L.; Ischenko, Jury Y.; Nefedov, Pavel S.; Pescherin, Ivan G.; Serebryanik, Ilya P.; and Polev, Evgeny I., 4,886,203, Cl. 228-126.000.

Yasuda, Kazuyuki: *See*—
Suzuki, Shigeo; and Yasuda, Kazuyuki, 4,886,556, Cl. 264-63.000.

Yasuhara, Kiyotado: *See*—
Yamasoe, Katsuyoshi; Yasuhara, Kiyotado; and Ikeda, Satoshi, 4,886,616, Cl. 252-142.000.

Yasui, Shinichiro: *See*—
Iihoshi, Akira; Nakamura, Yukinobu; and Yasui, Shinichiro, 4,887,081, Cl. 340-995.000.

Yasumoto, Mitsugi: *See*—
Fujii, Setsuro; Yamashita, Jun-ichi; Matsumoto, Hiroshi; Takeda, Setsuo; Terada, Tadafumi; Yasumoto, Mitsugi; and Unemi, Norio, 4,886,877, Cl. 536-23.000.

Yasutake, Kunihiro: *See*—
Eshima, Taizo; Yasutake, Kunihiro; and Yamasaki, Katuhiko, 4,885,837, Cl. 29-564.000.

Yates, Donald N., Jr., to Baker Hughes Incorporated. Method and apparatus for firing a perforating gun. 4,886,126, Cl. 175-4.540.

Yatsuzuka, Yasuhumi: *See*—
Tsujioka, Hiroshi; Yoneda, Shigeo; and Yatsuzuka, Yasuhumi, 4,887,227, Cl. 364-519.000.

Yazaki Corporation: *See*—
Iino, Tadashi, 4,886,328, Cl. 340-980.000.

Yazdy, Farid A.: *See*—
Garverick, Timothy L.; Yazdy, Farid A.; Henderson, Richard D.; and Meier, Webster B., 4,887,240, Cl. 361-222.000.

Yee, David T.; Lin, Eric; and Yee, Fang-Tung, to A B Oriental Trading Company, Inc. Tandem baby carriage with facing seats. 4,886,289, Cl. 280-643.000.

Yee, Fang-Tung: *See*—
Yee, David T.; Lin, Eric; and Yee, Fang-Tung, 4,886,289, Cl. 280-643.000.

Yee, Jordan. Medical applicator process. 4,886,493, Cl. 604-54.000.

Yeh, Tzong I.: *See*—
Erceg, Jack P.; and Yeh, Tzong I., 4,885,820, Cl. 16-225.000.

Yellowstone Diagnostics Corporation: *See*—
Gustafson, Eric K.; Trebino, Rick; and Lee, John, 4,886,761, Cl. 436-518.000.

Yemington, Charles R.: *See*—
Moles, David A.; and Yemington, Charles R., 4,886,395, Cl. 405-169.000.

Yodlowski, Robert A. J.: *See*—
Wolrich, Gilbert M.; McLellan, Edward J.; and Yodlowski, Robert A. J., 4,887,232, Cl. 364-754.000.

Yokota, Takashi: *See*—
Ikeda, Kunihiko; Suzuki, Shigeru; Yokota, Takashi; Shimura, Akira; Kodama, Yutaka; Yamazaki, Shigeru; Niro, Masaichi; and Tomita, Satoru, 4,887,133, Cl. 355-321.000.

Yokoyama, Kazumasa: *See*—
Ashimori, Atsuyuki; Ono, Taizo; Inoue, Yoshihisa; Fukaya, Chikara; and Yokoyama, Kazumasa, 4,886,819, Cl. 514-356.000.

Yokoyama, Keiichi: *See*—
Tan, Hiroaki; Yokoyama, Keiichi; and Kihara, Noriaki, 4,886,912, Cl. 564-240.000.

Yoneda, Kenichi: *See*—
Shinoda, Naoharu; Yoneda, Kenichi; Hino, Masao; Muramatsu, Kenzo; Miyake, Masato; Shimizu, Taku; and Otani, Hidehiko, 4,886,524, Cl. 55-8.000.

Yoneda, Masahiro; Hatanaka, Masahiro; Kohno, Yoshio; Satoh, Shinichi; Oda, Hidekazu; and Moriizumi, Koichi, to Mitsubishi Denki Kabushiki Kaisha. Semiconductor memory device. 4,887,137, Cl. 357-23.600.

Yoneda, Shigeo: *See*—
Tsujioka, Hiroshi; Yoneda, Shigeo; and Yatsuzuka, Yasuhumi, 4,887,227, Cl. 364-519.000.

Yoneda, Yuko: *See*—
Graham, Richard S.; Yoneda, Yuko; and Young, Frank E., 4,886,754, Cl. 435-172.300.

Yonenaga, Hitoshi: *See*—
Sato, Tomio; Matsuoka, Shigeru; Matsuda, Eiji; and Yonenaga, Hitoshi, 4,887,165, Cl. 358-474.000.

Yonezawa, Takeyuki: *See—*
Goto, Yasuhiro; Yonezawa, Takeyuki; and Ohnuma, Yoshiyuki, 4,886,767, Cl. 501-97.000.
York, James R.: *See—*
Shenoy, Vittal U.; Yang, Frank Y.; and York, James R., 4,887,129, Cl. 355-218.000.
Yoshida, Junichi; Sugano, Shinichi; and Koike, Masaaki, to Casio Computer Co., Ltd. Connector for a memory card. 4,887,188, Cl. 361-413.000.
Yoshida, Kiyohiro: *See—*
Kudo, Yoshinobu; and Yoshida, Kiyohiro, 4,886,342, Cl. 350-252.000.
Yoshikawa, Masao; and Kobayashi, Tatuya, to Canon Kabushiki Kaisha. Image forming apparatus. 4,887,102, Cl. 346-157.000.
Yoshimura, Hiroyuki: *See—*
Yamagishi, Youji; Akasaka, Kozo; Suzuki, Takeshi; Miyamoto, Mitsuaki; Nakamoto, Kouji; Okano, Kazuo; Abe, Shinya; Ikuta, Hironori; Hayashi, Kenji; Yoshimura, Hiroyuki; Fujimori, Tohru; Harada, Koukichi; and Yamatsu, Isao, 4,886,834, Cl. 514-521.000.
Yoshimura, Narihiko; Komatsu, Yasuji; and Tomizawa, Hirotaka, to TOA Nenryo Kogyo, K.K. Traction fluid. 4,886,613, Cl. 252-79.000.
Yoshimura, Narihiko; Tomizawa, Hirotaka; and Komatsu, Yasuji, to Toa Nenryo Kogyo, K.K. Synthetic traction fluid. 4,886,614, Cl. 252-79.000.
Yoshimura, Yuichiro: *See—*
Suzuki, Noriyuki; Tanaka, Atsushi; Kaneko, Kiyoshi; Yoshimura, Yuichiro; Taniishi, Shinnosuke; Kobayashi, Katsuyuki; and Mori, Shigeki, 4,886,943, Cl. 178-18.000.
Yoshino, Shigeru, to Fuji Photo Film Co., Ltd. Belt color filters in an image recording apparatus. 4,887,124, Cl. 355-32.000.
Yoshino, Takehito: *See—*
Aoike, Tatsuyuki; Sano, Masafumi; Yoshino, Takehito; Kariya, Toshimitsu; and Niino, Hiroaki, 4,886,723, Cl. 430-65.000.
Yoshitomi, Shingo, to Kabushiki Kaisha Araki Gomu. Tool for assisting spray work at high position. 4,886,191, Cl. 222-174.000.
Younes, Usama E., to Arco Chemical Technology, Inc. Laminated composite of a rigid polyurethane modified polyisocyanurate substrate and metal, plastic, cellulose, glass, ceramic or combinations thereof. 4,886,700, Cl. 428-252.000.
Young, David A., to Young Rubber Company. Insulating non-removable type concrete wall forming structure and device and system for attaching wall coverings thereto. 4,885,888, Cl. 52-426.000.
Young, Frank E.: *See—*
Graham, Richard S.; Yoneda, Yuko; and Young, Frank E., 4,886,754, Cl. 435-172.300.
Young, Robert H.: *See—*
Perdelwitz, Lee E., Jr; Young, Robert H.; Iff, Ron H.; Hanke, David E.; Allison, Kathleen S.; Rahkonen, Raimo K.; and Neogi, Amar N., 4,886,697, Cl. 428-192.000.
Young Rubber Company: *See—*
Young, David A., 4,885,888, Cl. 52-426.000.
Yu, Chorng-Tao; Fisk, Michael A.; and Emami, Alan, to Thermco Systems, Inc. Hot wall diffusion furnace and method for operating the furnace. 4,886,954, Cl. 219-390.000.
Yuge, Shizuo; Matsushita, Kouji; and Kawabata, Hidetoshi, to Minolta Camera Kabushiki Kaisha. Electrostatic latent image developing apparatus. 4,887,130, Cl. 355-251.000.
Yushio, Yasuhisa: *See—*
Sasame, Akira; Sakanoue, Hitoyuki; Takeuchi, Hisao; Miyake, Masaya; Yamakawa, Akira; and Yushio, Yasuhisa, 4,886,709, Cl. 428-552.000.
Zagame, Steven P.: *See—*
Kent, Allan R.; Read, Harold A.; Henry, Barry A.; Kaczor, Charles E.; Mills, Milton V.; Carn, Ronald C.; Metz, Donald R.; Zagame, Steven P.; and Kirk, Robert C., 4,887,076, Cl. 340-825.160.
Zallie, James P.: *See—*
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Zamaraev, Kirill I.: *See—*
Ismagilov, Zinfer R; Zamaraev, Kirill I.; Khairulin, Sergei R.; Alkhazov, Tofik G.; Ismagilov, Foat R.; Ivanov, Alexei A.; Barannik, Georgy B.; Kerzhentsev, Mikhail A.; Nemkov, Valentin V.; and Parmon, Valentin N., 4,886,649, Cl. 423-230.000.
Zamitter, Mikhail N.: *See—*
Azamatov, Ramil A.; Zamitter, Mikhail N.; Zema, Evgeny M.; Nedorezov, Vladimir A.; and Oblovatsky, Anatoly K., 4,886,292, Cl. 280-718.000.
Zamora, Antonio; Gunther, Michael D.; and Zamora, Elena M., to International Business Machines Corporation. Parser for natural language text. 4,887,212, Cl. 364-419.000.
Zamora, Elena M.: *See—*
Zamora, Antonio; Gunther, Michael D.; and Zamora, Elena M., 4,887,212, Cl. 364-419.000.
Zarini, Franco: *See—*
Perrone, Ettore; Alpegiani, Marco; Bedeschi, Angelo; Zarini, Franco; Della Bruna, Costantino; and Franceschi, Giovanni, 4,886,793, Cl. 514-192.000.
Zavoda, John R., to Zavoda Manufacturing Co., Inc. Self-retaining diaphragm seal. 4,885,983, Cl. 92-104.000.
Zavoda Manufacturing Co., Inc.: *See—*
Zavoda, John R., 4,885,983, Cl. 92-104.000.
Zawacki, Norbert W.: *See—*
Dop, Dennis B.; Freitag, Michael G.; and Zawacki, Norbert W., 4,887,290, Cl. 379-33.000.
Zecman, Kenneth P. Piston for cold chamber. 4,886,107, Cl. 164-113.000.
Zejda, Jaroslav: *See—*
Anderle, Friedrich; Costescu, Dan L.; Kempf, Stefan; Novak, Emmerich; and Zejda, Jaroslav, 4,886,592, Cl. 204-298.000.
Zema, Evgeny M.: *See—*
Azamatov, Ramil A.; Zamitter, Mikhail N.; Zema, Evgeny M.; Nedorezov, Vladimir A.; and Oblovatsky, Anatoly K., 4,886,292, Cl. 280-718.000.
Zepp, Charles M.: *See—*
Arnost, Michael J.; Inbar, Shai; Meneghini, Frank A.; Palumbo, Paul S.; Siroud, Stephen G.; and Zepp, Charles M., 4,886,744, Cl. 435-6.000.
Zerbes, Rudolf; Linke, Siegfried W.; and Mohrmann, Karl H., to Bayer Aktiengesellschaft. Process for the preparation of oxiranes. 4,886,892, Cl. 549-519.000.
Zetena, Maurice F., Jr. Remote interconnection box utilizing shielding interconnecting brackets. 4,886,464, Cl. 439-98.000.
Ziegler, James T., to Novation Design Ltd. Connectble polygonal construction modules. 4,886,477, Cl. 446-104.000.
Zimmer, Lawrence E.: *See—*
Arvidson, Russell A.; Renick, James T.; Clegg, Robert D.; and Zimmer, Lawrence E., 4,886,504, Cl. 604-257.000.
Zimmerman, Bernhard, to Zinser Textilmaschinen GmbH. Apparatus for removing and filtering dirty air from equipment. 4,886,532, Cl. 55-302.000.
Zimmerman, Theodore S.; and Fulcher, Carol A., to Scripps Clinic and Research Foundation. Factor VIII coagulant polypeptides. 4,886,876, Cl. 530-383.000.
Zinnen, Hermann A., to UOP. Zeolitic para-xylene separation with tetralin heavy desorbent. 4,886,930, Cl. 585-828.000.
Zinser Textilmaschinen GmbH: *See—*
Zimmerman, Bernhard, 4,886,532, Cl. 55-302.000.
Ziph, Benjamin: *See—*
Meijer, Roelf J.; and Ziph, Benjamin, 4,885,980, Cl. 92-12.200.
Zoller-Kipper GmbH: *See—*
Pieperhoff, Hans J.; and Droge, Karl-Heinz, 4,886,411, Cl. 414-408.000.
Zolnowsky, John E.: *See—*
MacGregor, Douglas B.; Moyer, William C.; Zolnowsky, John E.; and Mothersole, David S., 4,887,203, Cl. 364-200.000.
Zucchini, Umberto: *See—*
Cuffiani, Illaro; Fabbri, Roberto; Margelli, Gian F.; and Zucchini, Umberto, 4,886,770, Cl. 502-104.000.
Zuraski, Jeffery A.: *See—*
Graber, David W.; Pawlak, Andrzej M.; and Zuraski, Jeffery A., 4,886,138, Cl. 180-142.000.
Pawlak, Andrzej M.; Graber, David W.; and Zuraski, Jeffery A., 4,886,137, Cl. 180-142.000.
Zyna SA: *See—*
Ventouras, Kimon, 4,886,669, Cl. 424-469.000.

LIST OF REISSUE PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 12TH DAY OF DECEMBER, 1989

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

Automotive Products plc: *See*—
Wimbush, Maurice J., Re. 33,127, Cl. 192-91.00A.

Hitachi, Ltd.: *See*—
Mase, Mashiro; Nagaoka, Takashi; Tsutsumi, Yoshitsugu; Taniyama, Minoru; and Terajima, Makoto, Re. 33,129, Cl. 415-90.000.

Longview Fibre Company: *See*—
Nordstrom, Duane M., Re. 33,128, Cl. 220-465.000.

Mase, Mashiro; Nagaoka, Takashi; Tsutsumi, Yoshitsugu; Taniyama, Minoru; and Terajima, Makoto, to Hitachi, Ltd. Vacuum pump. Re. 33,129, Cl. 415-90.000.

Nagaoka, Takashi: *See*—
Mase, Mashiro; Nagaoka, Takashi; Tsutsumi, Yoshitsugu; Taniyama, Minoru; and Terajima, Makoto, Re. 33,129, Cl. 415-90.000.

Nordstrom, Duane M., to Longview Fibre Company. Paperboard container for liquids including means to prevent fitment rotation. Re. 33,128, Cl. 220-465.000.

Taniyama, Minoru: *See*—
Mase, Mashiro; Nagaoka, Takashi; Tsutsumi, Yoshitsugu; Taniyama, Minoru; and Terajima, Makoto, Re. 33,129, Cl. 415-90.000.

Terajima, Makoto: *See*—
Mase, Mashiro; Nagaoka, Takashi; Tsutsumi, Yoshitsugu; Taniyama, Minoru; and Terajima, Makoto, Re. 33,129, Cl. 415-90.000.

Tsutsumi, Yoshitsugu: *See*—
Mase, Mashiro; Nagaoka, Takashi; Tsutsumi, Yoshitsugu; Taniyama, Minoru; and Terajima, Makoto, Re. 33,129, Cl. 415-90.000.

Wimbush, Maurice J., to Automotive Products plc. Clutch release mechanism. Re. 33,127, Cl. 192-91.00A.

Wittke, Ernest C. Gear assisted continuously variable transmission. Re. 33,126, Cl. 74-681.000.

LIST OF REEXAMINATION PATENTEES

TO WHOM

CERTIFICATES WERE ISSUED

Bhatia, Kishan: *See*—
Burnes, Edward E.; and Bhatia, Kishan, B1 4,515,759, Cl. 423-220.000.

Burnes, Edward E.; and Bhatia, Kishan, to NL Industries, Inc. Process of removing hydrogen sulfide from gas mixtures. B1 4,515,759, 12-12-89, Cl. 423-220.000.

Digital Equipment Corporation: *See*—
Rubinson, Barry L.; Gardner, Edward A.; Grace, William A.; Lary, Richard F.; and Keck, Dale R., B1 4,449,182, Cl. 364-200.000.

Gardner, Edward A.: *See*—
Rubinson, Barry L.; Gardner, Edward A.; Grace, William A.; Lary, Richard F.; and Keck, Dale R., B1 4,449,182, Cl. 364-200.000.

Grace, William A.: *See*—
Rubinson, Barry L.; Gardner, Edward A.; Grace, William A.; Lary, Richard F.; and Keck, Dale R., B1 4,449,182, Cl. 364-200.000.

Hartwell, Gary, to University of Virginia Alumni Patents Foundation, The. Fluoroscopic filtering. B1 4,499,591, 12-12-89, Cl. 378-62.000.

Keck, Dale R.: *See*—
Rubinson, Barry L.; Gardner, Edward A.; Grace, William A.; Lary, Richard F.; and Keck, Dale R., B1 4,449,182, Cl. 364-200.000.

Lary, Richard F.: *See*—
Rubinson, Barry L.; Gardner, Edward A.; Grace, William A.; Lary, Richard F.; and Keck, Dale R., B1 4,449,182, Cl. 364-200.000.

Newell, E. Strohm. Assembly for pulling a line. B1 3,730,483, 12-12-89, Cl. 254-371.000.

NL Industries, Inc.: *See*—
Burnes, Edward E.; and Bhatia, Kishan, B1 4,515,759, Cl. 423-220.000.

Recoton Corporation: *See*—
Schotz, Larry, B1 4,734,897, Cl. 369-2.000.

Rubinson, Barry L.; Gardner, Edward A.; Grace, William A.; Lary, Richard F.; and Keck, Dale R., to Digital Equipment Corporation. Interface between a pair of processors such as host and peripheral-controlling processors in data processing systems. B1 4,449,182, 12-12-89, Cl. 364-200.000.

Schotz, Larry, to Recoton Corporation. Cassette adapter for playback device such as a compact disk player. B1 4,734,897, 12-12-89, Cl. 369-2.000.

University of Virginia Alumni Patents Foundation, The: *See*—
Hartwell, Gary, B1 4,499,591, Cl. 378-62.000.

LIST OF DESIGN PATENTEES

AbleNet: *See*—
Hallgren, Leander; Rudy, Theodore R.; and Waite, Cheryl A., 305,022, Cl. D13-32.000.

Ampafrance S.A.: *See*—
Bigo, Jean; and Pasquini, Henri, 305,012, Cl. D12-129.000.
Bigo, Jean; and Pasquini, Henri, 305,013, Cl. D12-129.000.

Andersen Corporation: *See*—
Pena, Oscar E.; and Heyer, Peter T., 305,018, Cl. D13-35.000.
Pena, Oscar E.; and Heyer, Peter T., 305,019, Cl. D13-38.000.

Anderson, Bruce: *See*—
Bush, Paul S.; Bova, Richard; and Anderson, Bruce, 304,979, Cl. D6-422.000.
Bush, Paul S.; Bova, Richard; and Anderson, Bruce, 304,980, Cl. D6-449.000.
Bush, Paul S.; Bova, Richard; and Anderson, Bruce, 304,982, Cl. D6-479.000.

Antonious, Anthony J. Golf club head. 305,055, 12-12-89, Cl. D21-217.000.

Arita, Toyomi: *See*—
Shimoo, Kuniyuki; Arita, Toyomi; and Takada, Kazuo, 305,073, Cl. D28-49.000.

Arlington-Hews, Inc.: *See*—
Erickson, Harry, 305,041, Cl. D21-108.000.

Artwick, Kert E.: *See—*
De Block, David A.; and Artwick, Kert E., 305,069, Cl. D25-60.000.

Asakawa, Takahiro: *See—*
Kanazawa, Kengo; Tako, Kenji; and Asakawa, Takahiro, 305,009, Cl. D12-110.000.

Astra Meditec Akteibolag: *See—*
Buchel, Udo P.; and Wellenstam, Kjell I., 305,065, Cl. D24-51.000.

Aten, Michael R.: *See—*
Bisha', Jon; and Aten, Michael R., 305,060, Cl. D24-8.000.

Baxter, James A., to Chromacol Limited. Sample vial. 304,997, 12-12-89, Cl. D9-349.000.

Bench, Ronald W.; and Duell, Richard J., to Carrier Corporation. Electronic control module enclosure. 305,021, 12-12-89, Cl. D13-12.000.

Bigo, Jean; and Pasquini, Henri, to Ampafrance S.A. Stroller. 305,012, 12-12-89, Cl. D12-129.000.

Bigo, Jean; and Pasquini, Henri, to Ampafrance S.A. Baby carriage. 305,013, 12-12-89, Cl. D12-129.000.

Bisha', Jon; and Aten, Michael R., to Fisher Scientific Company. Dual channel IV infusion pump. 305,060, 12-12-89, Cl. D24-8.000.

Blispack Corp. A Florida Corporation: *See—*
Hernandez, Carlos, 305,000, Cl. D9-415.000.

Borgen, Arden L., to Borgen, Margaret Platt. Glass door. 305,067, 12-12-89, Cl. D25-48.000.

Borgen, Margaret Platt: *See—*
Borgen, Arden L., 305,067, Cl. D25-48.000.

Bova, Richard: *See—*
Bush, Paul S.; Bova, Richard; and Anderson, Bruce, 304,979, Cl. D6-422.000.
Bush, Paul S.; Bova, Richard; and Anderson, Bruce, 304,980, Cl. D6-449.000.
Bush, Paul S.; Bova, Richard; and Anderson, Bruce, 304,982, Cl. D6-479.000.

Bridgestone Corporation: *See—*
Hayakawa, Toshio; and Tsuda, Toru, 305,016, Cl. D12-147.000.

Brooks, Christopher J.: *See—*
Mulhauser, Paul J.; and Brooks, Christopher J., 305,064, Cl. D24-47.000.

Buchel, Udo P.; and Wellenstam, Kjell I., to Astra Meditec Akteibolag. Bellows for surgical drainage. 305,065, 12-12-89, Cl. D24-51.000.

Bush Industries, Inc.: *See—*
Bush, Paul S.; Bova, Richard; and Anderson, Bruce, 304,979, Cl. D6-422.000.
Bush, Paul S.; Bova, Richard; and Anderson, Bruce, 304,980, Cl. D6-449.000.
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Bush, Paul S.; Bova, Richard; and Anderson, Bruce, to Bush Industries, Inc. Desk or similar article. 304,979, 12-12-89, Cl. D6-422.000.

Bush, Paul S.; Bova, Richard; and Anderson, Bruce, to Bush Industries, Inc. Hutch or similar article. 304,980, 12-12-89, Cl. D6-449.000.

Bush, Paul S.; Bova, Richard; and Anderson, Bruce, to Bush Industries, Inc. Stand or similar article. 304,982, 12-12-89, Cl. D6-479.000.

Canhart Industries, Inc.: *See—*
Ward, Adele E.; Ward, O. R. K., Jr.; Lunau, Kevin R.; and Moore, A. E., 305,014, Cl. D12-131.000.

Carrier Corporation: *See—*
Bench, Ronald W.; and Duell, Richard J., 305,021, Cl. D13-12.000.

Catey, Harry; and Hesla, Erling C. Extension attachment for a telephone earpiece. 305,027, 12-12-89, Cl. D14-249.000.

Chromacol Limited: *See—*
Baxter, James A., 304,997, Cl. D9-349.000.

Cowan, Murray L., to Textron Inc. Expansion bracelet. 305,004, 12-12-89, Cl. D11-19.000.

Cowan, Murray L., to Trexton Inc. Expansion bracelet. 305,005, 12-12-89, Cl. D11-25.000.

Creative Athletic Products and Services, Inc.: *See—*
Jones, Kimberly J., 305,038, Cl. D21-14.000.

Dalton, James E. Side panel for a gazebo. 305,070, 12-12-89, Cl. D25-152.000.

De Block, David A.; and Artwick, Kert E., to ODL, Incorporated. Door light frame. 305,069, 12-12-89, Cl. D25-60.000.

DeVilbiss Company, The: *See—*
Morgan, Fredrick M., 305,057, Cl. D23-226.000.

Diamond, Maurice H., to Unidare Engineering Limited. Electric storage heater. 305,058, 12-12-89, Cl. D23-330.000.

D'Innocente, Ralph: *See—*
Jacuzzi, Roy A.; Pauls, James R.; and D'Innocente, Ralph, 305,062, Cl. D24-38.000.
Jacuzzi, Roy A.; D'Innocente, Ralph; and Pruscha, Peter K., 305,063, Cl. D24-38.000.
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Discovery Toys, Inc.: *See—*
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Klitsner, Daniel B., 305,043, Cl. D21-143.000.
Klitsner, Daniel B., 305,044, Cl. D21-143.000.
Klitsner, Daniel B., 305,045, Cl. D21-143.000.
Klitsner, Daniel B., 305,046, Cl. D21-143.000.
Klitsner, Daniel B., 305,047, Cl. D21-143.000.

Doi, Takayoshi, to Takara Co., Ltd. Reconfigurable toy hawk. 305,052, 12-12-89, Cl. D21-160.000.

Doi, Takayoshi, to Takara Co., Inc. Reconfigurable toy puma. 305,053, 12-12-89, Cl. D21-163.000.

Drackett Company, The: *See—*
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Duell, Richard J.: *See—*
Bench, Ronald W.; and Duell, Richard J., 305,021, Cl. D13-12.000.

Erickson, Harry, to Arlington-Hews, Inc. Toy construction connector element. 305,041, 12-12-89, Cl. D21-108.000.

Ferguson, Carolyn. Hair treatment ear guard. 305,072, 12-12-89, Cl. D28-9.000.

Fisher Scientific Company: *See—*
Bisha', Jon; and Aten, Michael R., 305,060, Cl. D24-8.000.

Fiskars Oy Ab: *See—*
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Fitzsimmons, Douglas W.: *See—*
Hayes, George L.; and Fitzsimmons, Douglas W., 305,001, Cl. D9-425.000.
Hayes, George L.; and Fitzsimmons, Douglas W., 305,002, Cl. D9-425.000.
Hayes, George L.; and Fitzsimmons, Douglas W., 305,003, Cl. D9-425.000.

Fossella, Gregory, to Jet Spray Corp. Beverage dispenser. 304,989, 12-12-89, Cl. D7-308.000.

French, John, to Tulipe International Inc. Ski rack or the like. 304,984, 12-12-89, Cl. D6-552.000.

Fuchs, Richard W. Belt type abrading machine. 305,029, 12-12-89, Cl. D15-124.000.

Fudro, Stanley J. Three dimensional game board. 305,039, 12-12-89, Cl. D21-17.000.

Fujushima, Susumu, to Tasco Sales, Inc. Telescopic sight or similar article. 305,031, 12-12-89, Cl. D16-132.000.

Fukushima, Susumu, to Tasco Sales, Inc. Illuminated telescopic sight or similar article. 305,030, 12-12-89, Cl. D16-132.000.

Fun-Riders: *See—*
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Gardner, Roger W. Sign anchor. 304,995, 12-12-89, Cl. D8-373.000.

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Greco, Vincent. Rolling gate grille. 305,068, 12-12-89, Cl. D25-50.000.

Gromer, Robert D., Jr., to Goldblatt Tool Co. Tape dispenser. 305,037, 12-12-89, Cl. D19-69.000.

Grossiord, Claude, to S.T. DuPont. Key-ring. 304,976, 12-12-89, Cl. D3-61.000.

Hallgren, Leander; Rudy, Theodore R.; and Waite, Cheryl A., to AbleNet. Pressure sensitive push button switch. 305,022, 12-12-89, Cl. D13-32.000.

Harold, Thomas L. Vehicle starter switch auxiliary handle. 304,994, 12-12-89, Cl. D8-308.000.

Harrington, William J. Clamp. 304,978, 12-12-89, Cl. D8-395.000.

Hayakawa, Toshio; and Tsuda, Toru, to Bridgestone Corporation. Automobile tire. 305,016, 12-12-89, Cl. D12-147.000.

Hayes, George L.; and Fitzsimmons, Douglas W., to Hoffman-La Roche Inc. Chemistry analyzer tray. 305,001, 12-12-89, Cl. D9-425.000.

Hayes, George L.; and Fitzsimmons, Douglas W., to Hoffman-La Roche Inc. Chemistry analyzer tray. 305,002, 12-12-89, Cl. D9-425.000.

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Henkel Kommanditgesellschaft auf Aktien: *See—*
Hollenberg, Detlef; Schneider, Hans; Stoeffler, Albert; and Weihrauch, Georg, 304,996, Cl. D9-338.000.

Hernandez, Carlos, to Blispack Corp. A Florida Corporation. Blister package. 305,000, 12-12-89, Cl. D9-415.000.

Hesla, Erling C.: *See—*
Catey, Harry; and Hesla, Erling C., 305,027, Cl. D14-249.000.

Heyer, Peter T.: *See—*
Pena, Oscar E.; and Heyer, Peter T., 305,018, Cl. D13-35.000.
Pena, Oscar E.; and Heyer, Peter T., 305,019, Cl. D13-38.000.

Hiroki, Shin-ichi, to Kabushiki Kaisha Toshiba. Sheet feeder. 305,034, 12-12-89, Cl. D18-22.000.

Hiroo, Minami, to Yoshida Kogyo K. K. Slider body for slide fastener. 305,007, 12-12-89, Cl. D11-221.000.

Hitachi, Ltd.: *See—*
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Hoffman-La Roche Inc.: *See—*
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Hayes, George L.; and Fitzsimmons, Douglas W., 305,003, Cl. D9-425.000.

Hollenberg, Detlef; Schneider, Hans; Stoeffler, Albert; and Weihrauch, Georg, to Henkel Kommanditgesellschaft auf Aktien. Dispensing container. 304,996, 12-12-89, Cl. D9-338.000.

Honda Giken Kogyo Kabushiki Kaisha: *See—*
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Humphrey, Kyle J. Deck railing. 305,066, 12-12-89, Cl. D25-38.000.

Ichkiawa, Yukinobu: *See—*
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International Business Machines Corp.: *See—*
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Ishizawa, Takayuki, to Takara Co., Ltd. Reconfigurable double headed figure toy. 305,050, 12-12-89, Cl. D21-149.000.

Ishizawa, Takayuki, to Takara Co., Ltd. Reconfigurable toy insect. 305,054, 12-12-89, Cl. D21-185.000.

Jacuzzi Inc.: *See*—
Jacuzzi, Roy A.; Pauls, James R.; and D'Innocente, Ralph, 305,062, Cl. D24-38.000.

Jacuzzi, Roy A.; Pauls, James R.; and D'Innocente, Ralph, to Jacuzzi Inc. Whirlpool bath tub. 305,062, 12-12-89, Cl. D24-38.000.

Jacuzzi, Roy A.; D'Innocente, Ralph; and Pruscha, Peter K., to Jacuzzi Whirlpool Bath. Whirlpool bath tub. 305,063, 12-12-89, Cl. D24-38.000.

Jacuzzi Whirlpool Bath: *See*—
Jacuzzi, Roy A.; D'Innocente, Ralph; and Pruscha, Peter K., 305,063, Cl. D24-38.000.
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Jefferson, Robert W. Gameboard. 305,040, 12-12-89, Cl. D21-22.000.

Jet Spray Corp.: *See*—
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Hiroki, Shin-ichi, 305,034, Cl. D18-22.000.
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Kanazawa, Kengo; Tako, Kenji; and Asakawa, Takahiro, to Honda Giken Kogyo Kabushiki Kaisha. Motorcycle. 305,009, 12-12-89, Cl. D12-110.000.

Klitsner, Daniel B., to Discovery Toys, Inc. Y-intersection marble race toy. 305,042, 12-12-89, Cl. D21-143.000.

Klitsner, Daniel B., to Discovery Toys, Inc. Finishing lane marble race toy. 305,043, 12-12-89, Cl. D21-143.000.

Klitsner, Daniel B., to Discovery Toys, Inc. Passing lane marble race toy. 305,044, 12-12-89, Cl. D21-143.000.

Klitsner, Daniel B., to Discovery Toys, Inc. Switch track marble race toy. 305,045, 12-12-89, Cl. D21-143.000.

Klitsner, Daniel B., to Discovery Toys, Inc. Landing ramp marble race toy. 305,046, 12-12-89, Cl. D21-143.000.

Klitsner, Daniel B., to Discovery Toys, Inc. Banked hairpin marble race toy. 305,047, 12-12-89, Cl. D21-143.000.

Koyo Electronics Industries Co., Ltd.: *See*—
Naoi, Kiichi; Watanabe, Yuichi; and Manta, Hitoshi, 305,020, Cl. D13-12.000.

Kunihiro, Takashi, to Takara Co., Ltd. Reconfigurable toy dinosaur. 305,049, 12-12-89, Cl. D21-148.000.

Libenson, Robert D. Headrest. 304,987, 12-12-89, Cl. D6-601.000.

Lunau, Kevin R.: *See*—
Ward, Adele E.; Ward, O. R. K., Jr.; Lunau, Kevin R.; and Moore, A. E., 305,014, Cl. D12-131.000.

Lund Industries, Inc.: *See*—
Lund, James R., 305,017, Cl. D12-181.000.

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Manta, Hitoshi: *See*—
Naoi, Kiichi; Watanabe, Yuichi; and Manta, Hitoshi, 305,020, Cl. D13-12.000.

Masaaki, Iino, to Kabushiki Kaisha Toshiba. Telephone. 305,025, 12-12-89, Cl. D14-151.000.

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Matushita Electric Industrial Co., Ltd.: *See*—
Nishiyori, Hiroaki; and Tsubaki, Hiroyuki, 305,024, Cl. D14-131.000.

Miranda, Pasquale; and Irish, Timothy, to Murray Feiss Import Corp. Combined ceiling fan and light. 305,059, 12-12-89, Cl. D23-377.000.

MMG Corporation: *See*—
Raskas, Stuart I., 304,981, Cl. D6-478.000.

Mockovak, Robert A., to Remington Products, Inc. Combined hair clipper, base and accessories therefor. 305,074, 12-12-89, Cl. D28-53.000.

Moomaw, David E., to Quaker Oats Company, The. Toy airplane cockpit. 305,048, 12-12-89, Cl. D21-142.000.

Moore, A. E.: *See*—
Ward, Adele E.; Ward, O. R. K., Jr.; Lunau, Kevin R.; and Moore, A. E., 305,014, Cl. D12-131.000.

Morgan, Fredrick M., to DeVilbiss Company, The. Spray gun. 305,057, 12-12-89, Cl. D23-226.000.

Morton Springer & Co., Inc.: *See*—
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Movitz, Mark. Portable ball container. 304,975, 12-12-89, Cl. D3-36.000.

Mulhauser, Paul J.; and Brooks, Christopher J., to Richard-Allan Medical Industries, Inc. Surgical clip applier. 305,064, 12-12-89, Cl. D24-47.000.

Murray Feiss Import Corp.: *See*—
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Naoi, Kiichi; Watanabe, Yuichi; and Manta, Hitoshi, to Koyo Electronics Industries Co., Ltd. Programmable controller. 305,020, 12-12-89, Cl. D13-12.000.

Nemeth, Brad: *See*—
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Nishiyama, Takanori; Masatsugu, Shigeki; Suso, Kouji; and Ichkiawa, Yukinobu, to Hitachi, Ltd. Combined video tape recorder and camera. 305,032, 12-12-89, Cl. D16-202.000.

Nishiyori, Hiroaki; and Tsubaki, Hiroyuki, to Matushita Electric Industrial Co., Ltd. Combined radio and television receiver. 305,024, 12-12-89, Cl. D14-131.000.

Nunes, Brendon G. Locket. 305,006, 12-12-89, Cl. D11-81.000.

ODL, Incorporated: *See*—
De Block, David A.; and Artwick, Kert E., 305,069, Cl. D25-60.000.

Ohno, Kouzin, to Takara Co., Inc. Reconfigurable toy gorilla. 305,051, 12-12-89, Cl. D21-156.000.

Omlie, Donald E. Egg holder. 304,988, 12-12-89, Cl. D7-84.100.

Page, Robert. Trailer. 305,008, 12-12-89, Cl. D12-105.000.

Palka, James J. Door panel. 304,983, 12-12-89, Cl. D6-492.000.

Pappas, Angelo G. Gun sling. 304,977, 12-12-89, Cl. D3-101.000.

Pardo, John; and Torongo, Albert H., to Drackett Company, The. Bottle. 304,998, 12-12-89, Cl. D9-376.000.

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Bigo, Jean; and Pasquini, Henri, 305,013, Cl. D12-129.000.

Pauls, James R.; and D'Innocente, Ralph, to Jacuzzi Whirlpool Bath. Whirlpool spa tub. 305,061, 12-12-89, Cl. D24-38.000.

Pauls, James R.: *See*—
Jacuzzi, Roy A.; Pauls, James R.; and D'Innocente, Ralph, 305,062, Cl. D24-38.000.

Pena, Oscar E.; and Heyer, Peter T., to Andersen Corporation. Remote window controller. 305,018, 12-12-89, Cl. D13-35.000.

Pena, Oscar E.; and Heyer, Peter T., to Andersen Corporation. Single window controller. 305,019, 12-12-89, Cl. D13-38.000.

Pipon, Andrew, to Fun-Riders. Stroller. 305,011, 12-12-89, Cl. D12-129.000.

Platte, Richard L., Sr., to Sierra Spring Water Company. Bottle. 304,999, 12-12-89, Cl. D9-376.000.

Pruscha, Peter K.: *See*—
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Quaker Oats Company, The: *See*—
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Rankin, Thomas A. Bicycle rack. 305,010, 12-12-89, Cl. D12-115.000.

Raptis, Audrey M. Combined magazine holder and display frame. 304,985, 12-12-89, Cl. D6-553.000.

Raskas, Stuart I., to MMG Corporation. Tie display rack. 304,981, 12-12-89, Cl. D6-478.000.

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Richard-Allan Medical Industries, Inc.: *See*—
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Ricks, James E. Golf shoe spike tool. 305,056, 12-12-89, Cl. D21-234.000.

Roberge, Ronald R. Multi-layered frying basket. 304,991, 12-12-89, Cl. D7-409.000.

Roche, Cyril J. Tray for an invalid walker. 305,015, 12-12-89, Cl. D12-133.000.

Rourke, William J. Combined bracket and trash bag support for a post-mounted tray. 304,986, 12-12-89, Cl. D6-574.000.

Rudy, Theodore R.: *See*—
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S.T. DuPont: *See*—
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Sanyo Electric Co., Ltd.: *See*—
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Sherwood, Carl H.; and Wendt, Peter R., to General Motors Corporation. Exhaust gas recirculation valve cover. 305,028, 12-12-89, Cl. D15-5.000.

Shimoo, Kuniyuki; Arita, Toyomi; and Takada, Kazuo, to Sanyo Electric Co., Ltd. Electric shaver. 305,073, 12-12-89, Cl. D28-49.000.

Shur-Line, Inc.: *See*—
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Sierra Spring Water Company: *See*—
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Springer, Alan, to Morton Springer & Co., Inc. Double burner table range. 304,990, 12-12-89, Cl. D7-367.000.

Stoeffler, Albert: *See*—
Hollenberg, Detlef; Schneider, Hans; Stoeffler, Albert; and Weihrauch, Georg, 304,996, Cl. D9-338.000.

Sunila, Timo, to Fiskars Oy Ab. Hanging attachment for tool handles. 304,993, 12-12-89, Cl. D8-107.000.

Suso, Kouji: *See*—
Nishiyama, Takanori; Masatsugu, Shigeki; Suso, Kouji; and Ichkiawa, Yukinobu, 305,032, Cl. D16-202.000.

Suto, Shigeru, to Kabushiki Kaisha Toshiba. Integrated circuit card with magnetic reading strip and keyboard and display. 305,023, 12-12-89, Cl. D14-117.000.

Takada, Kazuo: *See*—
Shimoo, Kuniyuki; Arita, Toyomi; and Takada, Kazuo, 305,073, Cl. D28-49.000.

Takara Co., Inc.: *See*—
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Ohno, Kouzin, 305,051, Cl. D21-156.000.

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Tako, Kenji: *See*—
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Tasco Sales, Inc.: *See*—
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Textron Inc.: *See*—
Cowan, Murray L., 305,004, Cl. D11-19.000.

Torongo, Albert H.: *See*—
Pardo, John; and Torongo, Albert H., 304,998, Cl. D9-376.000.

Trexton Inc.: *See*—
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Tripp, Leslie K. Lantern stand. 305,071, 12-12-89, Cl. D26-138.000.

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Tsuda, Toru: *See*—
Hayakawa, Toshio; and Tsuda, Toru, 305,016, Cl. D12-147.000.

Tulipe International Inc.: *See*—
French, John, 304,984, Cl. D6-552.000.

Unidare Engineering Limited: *See*—
Diamond, Maurice H., 305,058, Cl. D23-330.000.

Voetsch, Harold E. Bookmark. 305,036, 12-12-89, Cl. D19-34.000.

Waite, Cheryl A.: *See*—
Hallgren, Leander; Rudy, Theodore R.; and Waite, Cheryl A., 305,022, Cl. D13-32.000.

Ward, Adele E.; Ward, O. R. K., Jr.; Lunau, Kevin R.; and Moore, A. E., to Canhart Industries, Inc. Wheelchair. 305,014, 12-12-89, Cl. D12-131.000.

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Ward, Adele E.; Ward, O. R. K., Jr.; Lunau, Kevin R.; and Moore, A. E., 305,014, Cl. D12-131.000.

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Wellenstam, Kjell I.: *See*—
Buchel, Udo P.; and Wellenstam, Kjell I., 305,065, Cl. D24-51.000.

Wendell R. Brooks, Inc.: *See*—
Yon, Jac H.; and Nemeth, Brad, 305,035, Cl. D18-22.000.

Wendt, Peter R.: *See*—
Sherwood, Carl H.; and Wendt, Peter R., 305,028, Cl. D15-5.000.

Wiseman, John A., to International Business Machines Corp. Combined point of sale terminal and cash drawer. 305,033, 12-12-89, Cl. D18-4.000.

Wolf, Mitchell E. Microphone holder. 305,026, 12-12-89, Cl. D14-229.000.

Yon, Jac H.; and Nemeth, Brad, to Wendell R. Brooks, Inc. Computer paper tray. 305,035, 12-12-89, Cl. D18-22.000.

Yoshida Kogyo K. K.: *See*—
Hiroo, Minami, 305,007, Cl. D11-221.000.

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Bonds, Irwin H. Almond tree, "Lodi". 7,068, 12-12-89, Cl. 30.000.

Bradford, Lowell G.: *See*—
Bradford, Norman G.; and Bradford, Lowell G., 7,070, Cl. 43.000.

Bradford, Norman G.; and Bradford, Lowell G. Peach tree (Crown Princess). 7,070, 12-12-89, Cl. 43.000.

DeMarco, Medio. Peach tree named Lady Nancy. 7,069, 12-12-89, Cl. 42.000.

Flemer, William, III, to Newplant Associates. *Amelanchier candensis* "White Pillar" . 7,072, 12-12-89, Cl. 51.000.

Gordon, Louis R. Gordon's Gift bermuda grass. 7,073, 12-12-89, Cl. 88.000.

Newplant Associates: *See*—
Flemer, William, III, 7,072, Cl. 51.000.

Whiting, Hubert F. Zoysia Japonica grass plant ZT-11. 7,074, 12-12-89, Cl. 88.000.

CLASSIFICATION OF PATENTS

ISSUED DECEMBER 12, 1989

NOTE.—First number, class; second number, subclass; third number, patent number

CLASS 2

244 4,885,805
423 4,885,806
424 4,885,807
452 4,885,808

CLASS 4

259 4,885,809
496 4,885,810

CLASS 5

82 R 4,885,811
113 4,885,812
136 4,885,813

CLASS 8

149 4,886,515
149.1 4,885,814
408 4,886,516
416 4,886,517
566 4,886,518

CLASS 15

28 4,885,815
53 A 4,885,816
340.1 4,885,817

CLASS 16

110 R 4,885,818
121 4,885,819
225 4,885,820

CLASS 17

39 4,885,822
49 4,885,821

CLASS 19

296 4,885,823

CLASS 24

17 B 4,885,824
639 4,885,825

CLASS 26

80 4,885,826

CLASS 29

91.1 4,885,827
91.5 4,885,828
156.8 R 4,885,829
157 C 4,885,830
159.2 4,885,831
401.1 4,885,832
407 4,885,833
426.5 4,885,834
463 4,885,835
524.1 4,885,836
564 4,885,837
566.3 4,885,838
600 4,885,839
611 4,885,840
834 4,885,841

CLASS 30

121.5 4,885,842
387 4,885,843

CLASS 33

15 4,885,844
203.13 4,885,846
508 4,885,847
544.5 4,885,845

CLASS 34

57 R 4,885,848

CLASS 36

3 B 4,885,849
119 4,885,850
127 4,885,851

CLASS 37

260 4,885,852

CLASS 38

143 4,885,853

CLASS 40

152.1 4,885,854
301 4,885,855
453 4,885,856
533 4,885,857
538 4,885,858
539 4,885,859
606 4,885,860

CLASS 43

3 4,885,861
6 4,885,862
17.2 4,885,863
17.5 4,885,864
18.5 4,885,865
42.19 4,885,866
42.26 4,885,867

CLASS 44

51 4,886,519
62 4,886,520
607 4,886,521
624 4,886,522

CLASS 47

58 4,885,868
66 4,885,869
79 4,885,870

CLASS 49

176 4,885,871
362 4,885,872

CLASS 51

121 4,885,873
165.71 4,886,529
165.77 4,885,874
284 E 4,885,875
393 4,885,876

CLASS 52

2 4,885,877
6 4,885,878
63 4,885,879
169.6 4,885,880
173 DS 4,885,881
177 4,885,882
280 4,885,883
354 4,885,884
396 4,885,885
404 4,885,886
410 4,885,887
426 4,885,888
484 4,885,889
506 4,885,890
646 4,885,891
690 4,885,892
745 4,885,893

CLASS 53

68 4,885,894
73 4,885,895
116 4,885,896
407 4,885,897
513 4,885,898
527 4,885,899
551 4,885,900
589 4,885,901

CLASS 55

1 4,886,523
8 4,886,524
55 4,886,525
131 4,886,526
156 4,886,527
158 4,886,528
199 4,886,530
244 4,886,531
302 4,886,532
498 4,886,533

CLASS 56

8 4,885,902
10.8 4,885,903
15 4,886,628

CLASS 57

67 4,885,904
119 4,885,905
263 4,885,906

CLASS 59

78 4,885,907
78.1 4,885,908

CLASS 60

39.02 4,885,909
547.1 4,885,982
562 4,885,910
597 4,885,911
652 4,885,912
673 4,885,913

CLASS 62

35 4,886,534
129 4,885,914
238.6 4,885,915
244 4,885,916
343 4,885,917

CLASS 65

1 4,886,535
3.1 4,886,536
4.3 4,886,537
30.13 4,886,538
135 4,886,539
351 4,886,540

CLASS 70

34 4,885,919
49 4,885,920
159 4,885,921
264 4,885,922
284 4,885,923

CLASS 71

77 4,886,541
88 4,886,543
4,886,544
4,886,545
4,886,546
087 4,886,542

CLASS 72

109 4,885,924
292 4,885,925
306 4,885,926
342 4,885,927
410 4,885,928

CLASS 73

23 4,885,929
37 4,885,930
49.2 4,885,931
53 4,885,932
79 4,885,933
115 4,885,934
117.2 4,885,935
146 4,885,936
189 4,885,937
204.18 4,885,938
379 4,885,939
744 4,885,940
794 4,885,941
861.28 4,885,942
861.77 4,885,943
862.36 4,885,944
863.32 4,885,945

CLASS 74

18.1 4,885,946
4,885,947
89.14 4,885,948
193 4,885,949
409 4,885,950
502.2 4,885,951
569 4,885,952
606 R 4,885,953
625 4,885,954
681 Re.33,126
691 4,885,955
710.5 4,885,956
4,885,957
715 4,885,958
801 4,885,959
866 4,885,960

CLASS 75

0.5 C 4,886,547

CLASS 81

55 4,885,961
57.31 4,885,962
57.32 4,885,963

CLASS 83

56 4,885,964
100 4,885,965
397 4,885,966
520 4,885,967
843 4,885,968

CLASS 84

1.01 4,885,969
1.15 4,885,970
387 4,885,971
403 4,885,972

CLASS 85

133.1 4,886,305

CLASS 87

1 4,885,973

CLASS 89

8 4,885,974
33.25 4,885,975
35.01 4,885,976
41.05 4,885,977

CLASS 91

232 4,885,978
369.1 4,885,979

CLASS 92

12.2 4,885,980
59 4,885,981
104 4,885,983

CLASS 98

42.02 4,885,984
55 4,885,985

CLASS 99

289 R 4,885,986
295 4,885,987
449 4,885,988
450 4,885,989

CLASS 100

88 4,885,990
99 4,885,991

CLASS 101

38.1 4,885,992

CLASS 102

307 4,885,993
473 4,885,994

CLASS 104

118 4,885,995
134 4,885,996
172.3 4,885,997

CLASS 106

18.12 4,886,548
19 4,886,549
74 4,886,550
183 4,886,551

CLASS 108

139 4,885,998

CLASS 110

186 4,885,999
345 4,886,000
346 4,886,001

CLASS 111

102 4,886,002

CLASS 112

80.03 4,886,003
254 4,886,004
292 4,886,005
313 4,886,006

CLASS 114

102 4,886,007
4,886,008

CLASS 116

208 4,886,009
308 4,886,010

CLASS 118

4,886,011
667 4,886,012
668 4,886,013

CLASS 119

1 4,886,014
3 4,886,015
61 4,886,016

CLASS 122

4 D 4,886,017
367 C 4,886,018

CLASS 123

41.86 4,886,019
52 M 4,886,020
73 PP 4,886,021
90.17 4,886,022
197 AC 4,886,023
234 4,886,024
339 4,886,025
478 4,886,026
4,886,027
479 4,886,028
4,886,029
488 4,886,030
516 4,886,031
559 4,886,032
574 4,886,033
587 4,886,034
588 4,886,035
596 4,886,036
645 4,886,037

CLASS 124

23 R 4,886,038
4,886,039

CLASS 125

4,886,040

CLASS 126

19 R 4,886,041
21 R 4,886,042
39 C 4,886,044
39 R 4,886,043
41 R 4,886,045
299 D 4,886,046
552 4,886,047

CLASS 128

4 4,886,049
25 R 4,886,050
52 4,886,051
75 4,886,052
80 C 4,886,053
80 F 4,886,054
200.14 4,886,055
201.25 4,886,056
203.11 4,886,057
206.12 4,886,058
207.15 4,886,059
303.14 4,886,060
305 4,886,061
343 4,886,062
403 4,886,063
419 PG 4,886,064
642 4,886,065
645 4,886,066
657 4,886,067
660.01 4,886,068
661.01 4,886,069
675 4,886,070
760 4,886,071
763 4,886,072
774 4,886,073
785 4,886,074
787 4,886,075

CLASS 131

256 4,886,076
282 4,886,077

CLASS 132

73 4,886,078
319 4,886,079
320 4,886,080

CLASS 134

18 4,886,081
27 4,886,552
42 4,886,553
60 4,886,082

CLASS 135

88 4,886,083
103 4,886,084

CLASS 136

244 4,886,554
255 4,886,555

CLASS 137

1 4,886,085
4,886,086
68.1 4,886,087
78.3 4,886,088
202 4,886,089
624.11 4,886,090
625.65 4,886,091
627.5 4,886,092
855 4,886,093

CLASS 139

452 4,886,094

CLASS 141

4 4,886,095
45 4,886,096
333 4,886,097
368 4,886,098

CLASS 144

117 R 4,886,099

CLASS 148

3 4,886,557
146 4,886,558
421 4,886,559

CLASS 149

12 4,886,560

CLASS 152

219 4,886,100

CLASS 156

102 4,886,561
172 4,886,562
205 4,886,563
230 4,886,564
345 4,886,565
361 4,886,566
423 4,886,567
443 4,886,568
633 4,886,572
643 4,886,569
4,886,570
4,886,573
646 4,886,571

CLASS 157

1.22 4,886,101

CLASS 159

17.1 4,886,574

CLASS 160

177 4,886,102
178.1 4,886,103
370.2 4,886,104

CLASS 162

5 4,886,575
49 4,886,576
52 4,886,577
111 4,886,579
123 4,886,578

CLASS 164

16 4,886,105
70.1 4,886,106
113 4,886,107
461 4,886,108
504 4,886,109

CLASS 165

22 4,886,110
70 4,886,111
95 4,886,112
104.27 4,886,048

CLASS 166

51 4,886,113
65.1 4,886,114
77 4,886,115
105.5 4,886,116
187 4,886,117
245 4,886,118
267 4,886,119
274 4,886,120
382 4,886,121

CLASS 169

74 4,886,122

CLASS 172

7 4,886,123
32 4,886,124
371 4,886,125

CLASS 174

52.1 4,886,938
77 R 4,886,939

88 B 4,886,940
135 4,886,942

CLASS 175

4.54 4,886,126
4,886,127
19 4,886,128
40 4,886,129
73 4,886,130
340 4,886,131

CLASS 177

4 4,886,132
211 4,886,133

CLASS 178

18 4,886,941
4,886,943

CLASS 180

68.1 4,886,135
79.1 4,886,136
142 4,886,137
4,886,138
197 4,886,140
233 4,886,141
242 4,886,142

CLASS 182

142 4,886,143
146 4,886,139

CLASS 184

45.1 4,886,144

CLASS 187

8.71 4,886,145

CLASS 188

2 D 4,886,146
20 4,886,134
73.37 4,886,147
273 4,886,148
306 4,886,149

CLASS 190

1 4,886,150

CLASS 192

3.62 4,886,151
58 B 4,886,152
91 A Re.33,127
113 A 4,886,153
141 4,886,154

CLASS 198

377 4,886,155
692 4,886,156
839 4,886,157
853 4,886,158

CLASS 200

48 R 4,886,944
144 R 4,886,945
329 4,886,946

CLASS 202

228 4,886,580

CLASS 203

80 4,886,581

CLASS 204

1 T 4,886,584
16 4,886,583
23 4,886,585
128 4,886,586
130 4,886,587
146 4,886,588
182.8 4,886,589
232 4,886,590
291 4,886,591
298 4,886,592
302 4,886,593

CLASS 206

37.4 4,886,159
44 R 4,886,160
246 4,886,161
328 4,886,162
334 4,886,163
366 4,886,164
370 4,886,165
387 4,886,166
389 4,886,167
568 4,886,168
591 4,886,169
609 4,886,170

CLASS 208

210 4,886,594

CLASS 209

166 4,886,595
539 4,886,596

CLASS 210

170 4,886,605
263 4,886,598
287 4,886,599
321.68 4,886,597
321.79 4,886,601
321.8 4,886,600
637 4,886,602
641 4,886,603
653 4,886,604
684 4,886,606
739 4,886,607
785 4,886,608

CLASS 211

59.2 4,886,171
87 4,886,172
89 4,886,173

CLASS 212

149 4,886,174

CLASS 215

32 4,886,175
229 4,886,176
247 4,886,177
4,886,178
318 4,886,947

CLASS 219

10.55 A 4,886,949
10.55 B 4,886,951
10.55 E 4,886,950
10.55 F 4,886,948
10.77 4,886,952
64 4,886,953
390 4,886,954
494 4,886,955
541 4,886,956

CLASS 220

5 A 4,886,180
23.4 4,886,179
67 4,886,181
85 F 4,886,182
85 H 4,886,183
306 4,886,184
307 4,886,185
465 Re.33,128
468 4,886,187

CLASS 222

1 4,886,188
49 4,886,189
57 4,886,190
174 4,886,191
181 4,886,192
379 4,886,186
446 4,886,193
478 4,886,194

CLASS 223

85 4,886,195

CLASS 224

235 4,886,196
243 4,886,197

CLASS 225

106 4,886,198

CLASS 226

118 4,886,199

CLASS 228

1.1 4,886,200
37 4,886,201
120 4,886,202
126 4,886,203

CLASS 229

2.5 R 4,886,204
68 R 4,886,205
123.1 4,886,206

CLASS 235

482 4,886,957

CLASS 236

12.12 4,886,207

CLASS 239

77 4,886,208
116 4,886,209
193 4,886,210
222.17 4,886,211
315 4,886,212
458 4,886,213
676 4,886,214
690.1 4,886,215

CLASS 241

152 R 4,886,216
219 4,886,217
294 4,886,218

CLASS 242

58.6 4,886,219
188 4,886,220

CLASS 244

1 A 4,886,221
1 R 4,886,222
3.23 4,886,223
23 R 4,886,224
135 R 4,886,225

CLASS 246

121 4,886,226

CLASS 248

27.1 4,886,227
74.1 4,886,228
125 4,886,229
170 4,886,230
225.1 4,886,235
250 4,886,236
289.1 4,886,237
455 4,886,231
576 4,886,232
647 4,886,233

CLASS 249

83 4,886,238
117 4,886,239
196 4,886,234

CLASS 250

201 4,886,958
4,886,959
205 4,886,961
209 4,886,960
211 J 4,886,962
235 4,886,963
251 4,886,964
252.1 A 4,886,965
288 4,886,966
327.2 4,886,967
4,886,968
352 4,886,240
427 4,886,969
484.1 4,886,970
492.2 4,886,971
504 R 4,886,972
548 4,886,973
561 4,886,974
572 4,886,975
578 4,886,976
4,886,977

CLASS 251

214 4,886,241

CLASS 252

8.552 4,886,609
32.5 4,886,610
47 4,886,611
49.5 4,886,612
79 4,886,613
4,886,614
90 4,886,615
142 4,886,616
180 4,886,617
188.28 4,886,618
299.1 4,886,619
299.61 4,886,620
4,886,621
4,886,622
299.65 4,886,623
308 4,886,624
500 4,886,625
4,886,626
513 4,886,627

CLASS 254

8 B 4,886,242
88 4,886,243
371 B1 3,730,483
932 P 4,886,244

CLASS 256

67 4,886,245

CLASS 264

46.6 4,886,630
48 4,886,631
63 4,886,556
156 4,886,632
219 4,886,633
560 4,886,634

CLASS 266

157 4,886,246
246 4,886,247

CLASS 267

64.26 4,886,248
91 4,886,249
95 4,886,250
140.1 4,886,251
4,886,252
4,886,253
148 4,886,254
205 4,886,255
221 4,886,256

CLASS 269

9 4,886,257
328 4,886,258

CLASS 270

53 4,886,259
60 4,886,260

CLASS 271

11 4,886,261
176 4,886,263
186 4,886,262
229 4,886,264
279 4,886,265

CLASS 272

69 4,886,266

CLASS 273

26 R 4,886,267
29 A 4,886,268
30 4,886,269
139 4,886,270
142 HA 4,886,271
148 R 4,886,272
157 R 4,886,273
176 FB 4,886,274
183 C 4,886,275
201 4,886,276
232 4,886,277
242 4,886,278
261 4,886,279
423 4,886,280

CLASS 277

47 4,886,281

CLASS 280

4 4,886,282
14.1 4,886,283
43.12 4,886,284
43.14 4,886,285
47.35 4,886,286
246 4,886,287
250.1 4,886,288
643 4,886,289
704 4,886,290
707 4,886,291
718 4,886,292
736 4,886,293
755 4,886,294
777 4,886,295
805 4,886,296
809 4,886,297
842 4,886,298

CLASS 281

31 4,886,299

CLASS 285

26 4,886,300
39 4,886,301
56 4,886,302
99 4,886,303
104 4,886,304

CLASS 290

48 4,886,306
52 4,886,978

CLASS 292

216 4,886,307
281 4,886,308
336.3 4,886,309
4,886,310

CLASS 296

37.12 4,886,311
76 4,886,312
192 4,886,314

CLASS 297

250 4,886,315
284 4,886,316
417 4,886,317
482 4,886,318

CLASS 303

9.75 4,886,319
11 4,886,320
92 4,886,321
109 4,886,322
113 4,886,323

CLASS 305

42 4,886,324

CLASS 307

11 4,886,979
64 4,886,980
87 4,886,981
254 4,886,982
272.3 4,886,983
4,886,984
315 4,886,985
353 4,886,986
465 4,886,987

CLASS 310

49 R 4,886,988
89 4,886,989
184 4,886,990
212 4,886,991

CLASS 312

138.1 4,886,325
257.1 4,886,326
4,886,327

CLASS 313

153 4,886,992
231.51 4,886,993
318 4,886,994
344 4,886,995
400 4,886,996
406 4,886,997
414 4,886,998
4,886,999
422 4,887,000
461 4,887,001
607 4,887,002
634 4,887,003

CLASS 315

39 4,887,008
86 4,887,004
111.21 4,887,005
209 R 4,887,006
243 4,887,007
368 4,887,009
370 4,887,010
403 4,887,011

CLASS 318

434 4,887,012
489 4,887,013
568.11 4,887,014
568.13 4,887,016
609 4,887,015
626 4,887,017
778 4,887,018

CLASS 322

63 4,887,020

CLASS 323

279 4,887,021
284 4,887,022

CLASS 324

61 R 4,887,023
4,887,024
65 R 4,887,025
96 4,887,026
117 H 4,887,027
142 4,887,028
4,887,029
158 P 4,887,030
158 R 4,887,031
207 4,887,032
253 4,887,033
307 4,887,034
309 4,887,035
316 4,887,037
318 4,887,038
322 4,887,039
446 4,887,040
533 4,887,041

CLASS 328

133 4,887,042
155 4,887,043

CLASS 329

300 4,887,044

CLASS 330

69 4,887,045
252 4,887,046
257 4,887,047
258 4,887,048
286 4,887,049

CLASS 331

34 4,887,050
69 4,887,051
96 4,887,052
116 FE 4,887,053

CLASS 333

158 4,887,054

CLASS 335

6 4,887,055
126 4,887,056
190 4,887,057
216 4,887,058
281 4,887,059

CLASS 336

178 4,887,061

CLASS 337

299 4,887,062
380 4,887,063

CLASS 340

426 4,887,064
430 4,887,065
436 4,887,066
442 4,887,067
450.3 4,887,068
552 4,887,069
561 4,887,070
659 4,887,071
691 4,887,072
693 4,887,073
782 4,887,074
825.030 4,887,075
825.160 4,887,076
825.470 4,887,077
825.48 4,887,078
825.800 4,887,079
937 4,887,080
980 4,886,328
995 4,887,081

CLASS 341

26 4,887,082
56 4,887,083
160 4,887,084
169 4,887,085

CLASS 342

20 4,887,086
61 4,887,087
128 4,887,088

CLASS 343

700 MS 4,887,089
711 4,887,090
714 4,887,091

CLASS 346

1.1 4,887,092
75 4,887,093
76 PH 4,887,094
4,887,095
4,887,096
134 4,887,101
135.1 4,887,097
140 R 4,887,098
4,887,099
4,887,100
157 4,887,102
160.1 4,887,103

CLASS 350

6.1 4,887,019
6.5 4,886,329
4,886,330
96.12 4,886,331
4,886,332
96.15 4,886,333
4,886,334
96.20 4,886,335
4,886,336
4,886,337
96.29 4,886,338
96.34 4,886,339
145 4,886,340
162.22 4,886,341
252 4,886,342
335 4,886,343
350 R 4,886,344
355 4,886,345
4,887,104
358 4,886,346
551 4,886,347
622 4,886,348

CLASS 351

111 4,886,349
160 H 4,886,350
221 4,886,351

CLASS 354

21 4,887,105
62 4,887,106
195.1 4,887,108
195.12 4,887,107
222 4,887,109
275 4,887,110
4,887,111
4,887,112
4,887,113
288 4,887,114
289.1 4,887,115
320 4,887,116
400 4,887,117
413 4,887,118
4,887,119
416 4,887,120
430 4,887,121

CLASS 355

28 4,886,352
30 4,887,122
4,887,123
32 4,887,124
55 4,887,125
75 4,887,126
4,887,127
202 4,887,128
218 4,887,129
251 4,887,130
253 4,887,131

4,887,132
321 4,887,133
323 4,887,060

CLASS 356

4.5 4,886,353
70 4,886,354
73 4,886,355
246 4,886,356
300 4,886,357
301 4,886,358
312 4,886,359
335 4,886,360
345 4,886,361
346 4,886,362
349 4,886,363
350 4,886,364
351 4,886,365
406 4,886,366

CLASS 357

16 4,887,134
23.6 4,887,135
4,887,136
4,887,137
30 4,887,138
4,887,139
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36 4,887,141
43 4,887,142
49 4,887,143
50 4,887,144
59 4,887,145
71 4,887,146
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4,887,148
81 4,887,149

CLASS 358

48 4,887,252
80 4,887,150
4,887,151
86 4,887,152
98 4,887,153
4,887,154
107 4,887,155
133 4,887,156
4,887,157
143 4,887,158
183 4,887,159
213.26 4,887,160
224 4,887,161
296 4,887,167
299 4,887,168
335 4,887,169
400 4,887,162
443 4,887,163
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474 4,887,165

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73.06 4,887,172
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135 4,887,178
4,887,179

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103 4,887,181
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149 4,887,184
222 4,887,240
302 4,887,185
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306 4,887,197

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18 4,887,198
49 4,887,199
81 4,887,200
132 4,887,201

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474.11 4,887,220
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4,887,239
230.06 4,887,241
238.5 4,887,242

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150 4,886,368
165 4,886,369

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129 4,887,245
140 4,887,246
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15 4,887,250
21 4,887,251

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168 4,887,300

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124 4,886,381
4,886,382
208 4,886,383
223 4,886,384
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241.4 4,886,386

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148 4,886,388
191 4,886,389

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282 4,886,392

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141 4,886,394
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224 4,886,398
229 4,886,399
267 4,886,400

CLASS 406

182 4,886,401

CLASS 409

234 4,886,402

CLASS 410

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CLASS 411

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158 4,886,416
208.3 4,886,417
912 4,886,418

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598 4,886,654

CLASS 424

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10 4,886,656
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236 4,886,441
388 4,886,442
537 4,886,443

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56 4,886,673
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289 4,886,676
548 4,886,677
578 4,886,678
635 4,886,679

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213 4,886,698
228 4,886,699
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323 4,886,703
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447 4,886,708
552 4,886,709
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592 4,886,711
632 4,886,712
687 4,886,713
694 4,886,714

CLASS 429

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192 4,886,716

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20 4,886,718
58 4,886,719
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106.6 4,886,725
114 4,886,729
115 4,886,726
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270 4,886,734
311 4,886,727
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359 4,886,736
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510 4,886,738
617 4,886,739

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125 4,886,445
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72 4,886,454
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173 4,886,456

CLASS 434

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243 4,886,458
300 4,886,459

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269 4,886,758
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518 4,886,761

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200 4,886,764
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856 4,886,474

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CLASS 441

65 4,886,476

CLASS 446

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176 4,886,478

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156 4,887,308
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607 4,887,312
612 4,887,313
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97 4,886,767
104 4,886,768

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211 4,886,582

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227 4,886,775

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12 4,886,782
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345	4,886,818
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381	4,886,885
383	4,886,824
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411	4,886,826
412	4,886,827
450	4,886,828
	4,886,829
	4,886,830
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521	4,886,833
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532	4,886,835
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103	4,886,842
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453	4,886,846
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109	4,886,848
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413	4,886,850
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458	4,886,852
477	4,886,853
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73	4,886,856
74	4,886,857
301	4,886,858
327.8	4,886,859
329.4	4,886,872
439	4,886,875
474	4,886,860
CLASS 526	
145	4,886,861
247	4,886,862
262	4,886,863
264	4,886,864
CLASS 528	
15	4,886,865
59	4,886,866
111	4,886,867
170	4,886,868
196	4,886,869
206	4,886,870
226	4,886,871
353	4,886,873
	4,886,874
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383	4,886,876
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23	4,886,877
26	4,886,878
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486	4,886,879
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76	4,886,880
194	4,886,881
196	4,886,882
263	4,886,883
CLASS 546	
36	4,886,884
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432	4,886,886
490	4,886,887
497	4,886,888
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519	4,886,892
562	4,886,893
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193	4,886,896
252	4,886,897
343	4,886,936
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75	4,886,900
77	4,886,901
064	4,886,899
106	4,886,902
121	4,886,903
249	4,886,904
265	4,886,905
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490	4,886,907
567	4,886,908
826	4,886,629
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50	4,886,909
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221	4,886,911
240	4,886,912
255	4,886,913
343	4,886,914
503	4,886,915
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623	4,886,917
697	4,886,918
885	4,886,919
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210	4,886,923
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331	4,886,925
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500	4,886,931
	4,886,932
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	4,886,934
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828	4,886,929
	4,886,930
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74	4,886,494
88	4,886,495
96	4,886,496
111	4,886,497
118	4,886,498
131	4,886,499
164	4,886,500
175	4,886,501
	4,886,502
192	4,886,503
257	4,886,504
265	4,886,505
280	4,886,506
284	4,886,507
327	4,886,508
349	4,886,509
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365	4,886,511
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385.2	4,886,512
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	101	304,977
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	449	304,980
	478	304,981
	479	304,982
	492	304,983
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	574	304,986
	601	304,987
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	367	304,990
	409	304,991
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	107	304,993
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	395	304,978
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	376	304,998
		304,999
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	129	305,011
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	133	305,015
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	32	305,022
	35	305,018
	38	305,019
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	131	305,024
	151	305,025
	229	305,026
	249	305,027
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	124	305,029
D16—	132	305,030
		305,031
	202	305,032
D18—	4	305,033
	22	305,034
		305,035
D19—	34	305,036
	69	305,037
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	17	305,039
	22	305,040
	108	305,041
	142	305,048
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	163	305,053
	185	305,054
	217	305,055
	234	305,056
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	330	305,058
	377	305,059
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		305,062
		305,063
	47	305,064
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	60	305,069
	152	305,070
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D28—	9	305,072
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DESIGN PATENTS

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